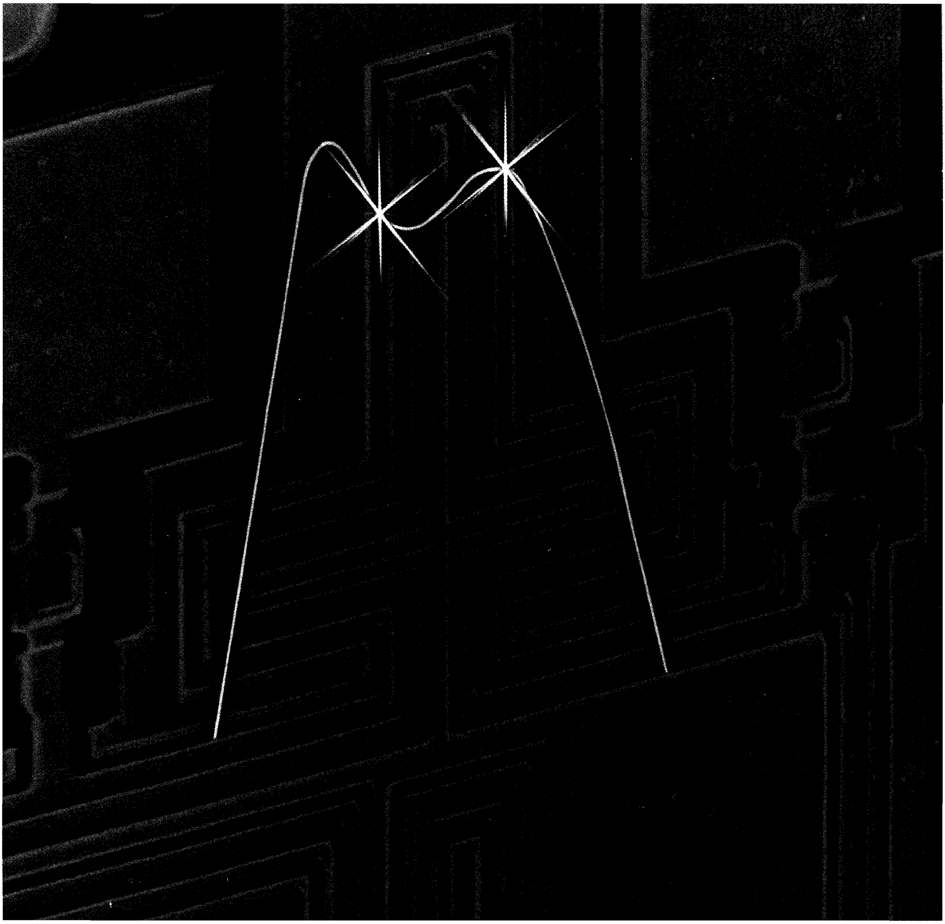
SIEMENS

Tuner Semiconductor Devices

Data Book 1986/87



Tuner Semiconductor Devices

Data Book 1986/87

Siemens Aktiengesellschaft

Straightforward ordering with the catalog "Siemens Components Service, Preferred Products".

Every year, a revised edition of the SCS catalog on Preferred Products is published. This catalog comprises preferred products of the entire Siemens components program including their main technical specs.

Orders for components as well as for the above mentioned catalog should be directed to your nearest Siemens Office, Components Division, or Distributor.

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A comma in the outline drawings and tables represents the decimal point.
The sign ∅ in drawings denotes diameter.

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Type code

The European type code according to Pro Electron is made up of 2 letters (type of material and application) and a serial code consisting of 3 or more digits.

The first letter denotes the semiconductor material:

A Germanium (or a band gap of 0.6—1 eV)
B Silicon (or a band gap of 1—1.3 eV)
C III—V material, e.g. gallium arsenide (or a band gap of more than 1.3 eV)
D Material with a band gap of less than 0.6 eV, e.g. indium antimonide
R Semiconductor compounds for photoconductive cells and Hall-effect devices

The second letter denotes the area of application:

A Signal diode, low power
B Capacitance diode
C AF small signal transistor, $R_{thJC} > 15$ K/W
D AF power transistor, $R_{thJC} < 15$ K/W
E Tunnel diode
F RF small signal transistor, $R_{thJC} > 15$ K/W
G Combination of components, array, multichip
H Hall field probe
L RF power transistor, $R_{thJC} < 15$ K/W
N Optocoupler
P Radiation detector, e.g. photovoltaic cell
Q Radiation emitter, e.g. light emitting diode
R Low power switching element with thyristor characteristics, $R_{thJC} > 15$ K/W
S Low power switching transistor, $R_{thJC} > 15$ K/W
T High power switching element with thyristor characteristics, $R_{thJC} < 15$ K/W
V High power switching transistor, $R_{thJC} < 15$ K/W
X Frequency multiplication diode
Y Power rectifier
Z Transient voltage suppressor, Z diode, reference diode

The serial code of components designed for use in "entertainment" electronics is a three-digit number (e.g. BF 970), while that of components primarily used in "industrial" electronics equipment consists of one letter and a two-digit number (e.g. BXY 43).

An additional letter attached to the serial code is used to define a mechanical or electrical variant.

Other type designations based on the JEDEC system or internal nomenclature may be used.

Type marking

If the size of the component allows, the complete designation, the manufacturing date code (year — month in accordance with DIN 41 314.1 or year, week in accordance with DIN 41 314.2 or EIA) and the manufacturer's logotype (§ or S) are printed on it. If there is insufficient space, short symbols as given in the data sheets are used. Color codes mentioned in the data sheets serve to differentiate types and groups.

Ordering code

The ordering codes for standard types are provided in the data sheets. Special versions manufactured on the basis of special supply contracts are assigned separate ordering codes.

Selection Guide

Survey of Types
Application Reference Table
Cross Reference Table of Packages
Types and Ordering Codes

Survey of types

Switching PIN diodes

Type	Characteristics ($T_A = 25\,°C$) V_{Rmax} V	C_T (f = 1 MHz) pF	V_R V	r_f (f = 100 MHz) Ω	I_F mA	Package	Page
BA 243	35	<2	15	<1	10	DO 35	30
BA 243 S	35	<1,5	5	<0,7	10	DO 35	32
BA 244	35	<2	15	<0,5	10	DO 35	30
BA 244 S	35	<1,5	5	<0,5	10	DO 35	32
BA 282	35	<1,2	3	<0,5	10	DO 35	34
BA 283	35	<1	3	<0,9	10	DO 35	34
BA 284	35	<1	20	<0,6	10	DO 35	36
▼BA 389	30	0,55	10	5	10	DO 35	38
▼BA 682	35	<1,2	3	<5	10	SOD 80	41
▼BA 683	35	<1	3	<0,9	10	SOD 80	41
▼BA 885	50	0,3	10	5	10	SOT 23	44

Tuning diodes

Type	C_T (f = 1 MHz) pF	V_R V	C_{T1}/C_{T2} —	V_{R1}; V_{R2} V; V	r_s Ω	Package	Page
▼BB 112	440...520	1	>18	1; 8,5	1,4	TO 92	46
BB 204 green	34...39	3	2,55...2,8	3; 30	0,2	TO 92	49
BB 204 blue	37...42	3	2,55...2,8	3; 30	0,2	TO 92	49
BB 304	42...47,5	2	1,65...1,75	2; 8	0,2	TO 92	52
▼BB 314	44,75	2	2,2	2; 8	0,25	TO 92	55
BB 409	4,5...5,6	25	5...6,5	3; 25	0,3	DO 35	57
BB 505 B	1,85...2,25	28	7,7...9,4	1; 28	0,62	DO 35	60
BB 505 G	1,8...2,4	28	7,5...9,5	1; 28	0,8	DO 35	60
▼BB 515 B	1,85...2,25	28	8...9,5	1; 28	0,55	Mini-plast	63
▼BB 515 G	1,8...2,4	28	7,5...9,5	1; 28	0,75	Mini-plast	63
BB 609 A	2,5...3	28	12...15	1; 28	0,7	DO 35	65
BB 609 B	2,8...3,2	28	12...15	1; 28	0,7	DO 35	65
▼BB 610	3,75	28	>19	1; 28	1,4	DO 35	67
▼BB 619 A	2,5...3	28	>12	1; 28	0,65	Mini-plast	69
▼BB 619 B	2,8...3,2	28	>12	1; 28	0,65	Mini-plast	69
▼BB 620	3,75	28	>19	1; 28	1,3	Mini-plast	71
▼BB 801	1	28	9	1; 28	1	SOT 23	73
▼BB 804	42...47,5	2	1,7	2; 8	0,25	SOT 23	75
▼BB 814	44,75	2	2,2	2; 8	0,25	SOT 23	78

▼ New types

Bipolar RF transistors

Type		Maximum ratings			Characteristics ($T_A = 25\ °C$)						Package	Page
PNP-P NPN-N		V_{CEO} V	I_C mA	P_{tot} mW	h_{FE} —	I_C mA	V_{CE} V	F dB	f MHz	f_T MHz		
BF 199	N	25	25	500	85 (>38)	7	10			550	TO 92	82
BF 240	N	40	25	250	65...220	1	10	1,7	0,1	400	TO 92	86
BF 241	N	40	25	250	35...125	1	10	1,7	0,1	400	TO 92	86
BF 254	N	20	30	250	65...220	1	10	1,2	1	260	TO 92	89
BF 255	N	20	30	250	35...130	1	10	3,8	100	220	TO 92	89
BF 414	P	30	25	300	80 (>30)	4	10	3	100	560	TO 92	92
BF 450	P	40	25	250	65...220	1	10	2	0,1	375	TO 92	94
BF 451	P	40	25	250	35...125	1	10	3	100	325	TO 92	94
BF 506	P	35	30	300	>25	3	10	3	200	550	TO 92	99
▼BF 517	N	15	25	280	25...250	5	10	5	800	2000	SOT 23	101
BF 550	P	40	25	280	50...250	1	10	3,4	100	350	SOT 23	104
BF 554	N	20	30	280	60...250	1	10	3	100	250	SOT 23	109
BF 569	P	35	30	280	50 (>20)	3	10	4,5	800	950	SOT 23	113
BF 579	P	20	30	280	>20	10	10	4	800	1600	SOT 23	116
BF 599	N	25	25	280	70 (>38)	7	10			550	SOT 23	119
BF 606 A	P	30	25	300	>30	1	10			700	TO 92	123
BF 660	P	30	25	280	>30	3	10			700	SOT 23	125
BF 763	N	15	25	500	25...250	5	10	5	800	2000	TO 92	128
▼BF 770 A	N	12	50	280	90 (>40)	30	5	2	800	5500	SOT 23	130
▼BF 775	N	12	30	280	40...250	5	6	2,1	800	4500	SOT 23	133
BF 799	N	20	35	280	40...250	20	10	3	100	1100	SOT 23	136
BF 959	N	20	100	500	40...250	20	10	3	200	1100	TO 92	139
BF 970	P	35	30	160	50 (>25)	3	10	4,5	800	950	T-plast	187
BF 979 S	P	25	50	160	>20	10	10	3,5	800	1600	T-plast	189

MOS field-effect tetrodes

Type	Maximum ratings			Characteristics ($T_A = 25\ °C$)						Package	Page
N channel	V_{DS} V	I_D mA	P_{tot} mW	g_{fs} mS	G_P dB	F dB	V_{DS} V	I_D mA	f MHz		
BF 960	20	30	200	12	16,5	2,8	15	7	800	X-plast	142
BF 961	20	30	200	17	23	1,1	15	10	200	X-plast	152
BF 963	20	50	200	25	25	1,5	15	10	200	X-plast	162
▼BF 964 S	20	30	200	18	25	1,0	15	10	200	X-plast	168
▼BF 965	20	30	200	18	25	1,0	15	10	200	X-plast	174
▼BF 966 S	20	30	200	18	18	1,8	15	10	800	X-plast	180
▼BF 989	20	30	200	12	16,5	2,8	15	7	800	SOT 143	191
▼BF 993	20	50	200	25	25	1,5	15	10	200	SOT 143	201
▼BF 994 S	20	30	200	18	25	1,0	15	10	200	SOT 143	208
▼BF 995	20	30	200	17	23	1,1	15	10	200	SOT 143	214
▼BF 996 S	20	30	200	18	18	1,8	15	10	800	SOT 143	224
▼BF 997	20	30	200	18	25	1,0	15	10	200	SOT 143	232

▼ New types

Application reference table

<table>
<tr><th colspan="2" rowspan="2">Application</th><th colspan="3">Tuner</th><th rowspan="2">IF amplifier</th></tr>
<tr><th>Input stage</th><th>Mixer</th><th>Oscillator</th></tr>
<tr><td rowspan="7">TV range</td><td rowspan="2">VHF</td><td colspan="3">BA 243/S
BA 244/S
BA 282
BA 283
BA 284
BA 389
BA 682
BA 683

BB 409
BB 505 G
BB 515 G</td><td rowspan="7">BF 199
BF 517
BF 599
BF 959</td></tr>
<tr><td>BF 961
BF 995</td><td>BF 506
BF 961
BF 995</td><td>BF 506
BF 606 A
BF 660</td></tr>
<tr><td rowspan="2">VHF
(CATV/
Hyperband)</td><td colspan="3">BB 609 A/B
BB 610
BB 619 A/B
BB 620</td></tr>
<tr><td>BF 964 S
BF 965
BF 994 S
BF 997</td><td>BF 506
BF 964 S
BF 965
BF 994 S
BF 997</td><td>BF 506
BF 517
BF 606 A
BF 660
BF 763</td></tr>
<tr><td rowspan="3">UHF</td><td colspan="3">BB 505 B
BB 515 B</td></tr>
<tr><td rowspan="2">BF 960
BF 966 S
BF 989
BF 996 S</td><td colspan="2">BF 569
BF 970</td></tr>
<tr><td>BF 579
BF 775
BF 979 S</td><td>BF 569
BF 970</td></tr>
<tr><td rowspan="2">TV-sat</td><td rowspan="2">Indoor
unit</td><td>BA 389
BA 885</td><td colspan="2"></td><td rowspan="2">BF 770 A</td></tr>
<tr><td colspan="3">BB 801
BF 775</td></tr>
</table>

continued on next page

cont'd

Application		Tuner			IF amplifier
		Input stage	Mixer	Oscillator	
Radio range	AM	BB 112			
	FM	BB 204 BB 304 BB 314 BB 804 BB 814			
		BF 255 BF 414 BF 961 BF 963 BF 993 BF 995	BF 241 BF 255 BF 451 BF 995	BF 241 BF 255 BF 451	BF 240 BF 241 BF 254 BF 255 BF 450 BF 451

Cross reference table of packages

Application \ Package	Conventional mounting				Surface mounting (SMD)			
	TO 92	T-plast	X-plast	DO 35	SOT 23	SOT 143	SOD 80	Mini-plast
1. Switching PIN diodes								
• VHF band switching				BA 243/S BA 244/S BA 282 BA 283 BA 284			BA 682 BA 683	
• Current-controlled RF resistor, TV-sat antenna switch				BA 389	BA 885			
2. Tuning diodes								
• AM	BB 112							
• FM	BB 204 BB 304				BB 804			
• Extended FM band	BB 314				BB 814			
• VHF				BB 409 BB 609 A/B				BB 619 A/B
• VHF (Hyperband)				BB 610				BB 620
• UHF/VHF				BB 505 B/G				BB 515 B/G
• UHF/TV-sat					BB 801			
3. Bipolar transistors								
• TV IF	BF 199				BF 599			
• AM, FM	BF 254 BF 255 BF 414				BF 554 BF 660			
• IF stage (AM, FM)	BF 450 BF 451 BF 240 BF 241				BF 550			
• VHF oscillator	BF 506 BF 606 A				BF 660 BF 660			
• RF amplifier/ oscillator	BF 763				BF 517			
• SAW filter driver	BF 959				BF 799			
• UHF mixer/ oscillator		BF 970 BF 979 S			BF 569 BF 579			
• TV-sat					BF 775 BF 770 A			
4. MOSFET tetrodes								
• UHF preamplifier			BF 960 BF 966 S			BF 989 BF 996 S		
• VHF FM input stage/mixer			BF 961 BF 963 BF 964 S BF 965			BF 995 BF 993 BF 994 S BF 997		

Types and ordering codes
(in alphanumerical order)

Type	Ordering code	Page	Type	Ordering code	Page
BA 243	Q62702-A521	30	BF 254	Q62702-F201	89
BA 243 S	Q62702-A607	32	BF 255	Q62702-F329	89
BA 244	Q62702-A421	30	BF 414	Q62702-F517	92
BA 244 S	Q62702-A618	32	BF 450	Q62702-F312	94
BA 282	Q62702-A428	34	BF 451	Q62702-F313	94
BA 283	Q62702-A429	34	BF 506	Q62702-F534	99
BA 284	Q62702-A632	36	BF 517	Q62702-F988	101
BA 389	Q62702-A732	38	BF 550	Q62702-F547	104
BA 682	Q62702-A723	41	BF 554	Q62702-F551	109
BA 683	Q62702-A145	41	BF 569	Q62702-F548	113
BA 885	Q62702-A742	44	BF 579	Q62702-F552	116
BB 112	Q62702-B240	46	BF 599	Q62702-F550	119
BB 204 blue	Q62702-B58-X6	49	BF 606 A	Q62702-F535	123
BB 204 green	Q62702-B57-X5	49	BF 660	Q62702-F549	125
BB 304	Q62702-B84	52	BF 763	Q62702-F766	128
BB 314	Q62702-B397	55	BF 770 A	Q62702-F1068	130
BB 409	Q62702-B112	57	BF 775	Q62702-F991	133
BB 505 B	Q62702-B37	60	BF 799	Q62702-F788	136
BB 505 G	Q62702-B270	60	BF 959	Q62702-F640	139
BB 515 B	Q62702-B398	63	BF 960	Q62702-F499	142
BB 515 G	Q62702-B399	63	BF 961	Q62702-F518	152
BB 609 A	Q62702-B196	65	BF 963	Q62702-F904	162
BB 609 B	Q62702-B197	65	BF 964 S	Q62702-F446	168
BB 610	Q62702-B400	67	BF 965	Q62702-F660	174
BB 619 A	Q62702-B401	69	BF 966 S	Q62702-F438	180
BB 619 B	Q62702-B402	69	BF 970	Q62702-F650	187
BB 620	Q62702-B403	71	BF 979 S	Q62702-F610	189
BB 801	Q62702-B346	73	BF 989	Q62702-F874	191
BB 804	Q62702-B328	75	BF 993	Q62702-F899	201
BB 814	Q62702-B404	78	BF 994 S	Q62702-F963	208
BF 199	Q62702-F355	82	BF 995	Q62702-F872	214
BF 240	Q62702-F302	86	BF 996 S	Q62702-F964	224
BF 241	Q62702-F303	86	BF 997	Q62702-F993	232

(shaded) = **SMD** **s**urface **m**ounted **d**evice

Explanation of Data Sheet Parameters
Quality Specifications

Explanation of Data Sheet Parameters

Maximum ratings

The maximum ratings specified are absolute ratings which, if exceeded, may result in the destruction or permanent functional impairment of the components. When testing the component, as for example with respect to breakdown voltage, or during application, protection has to be provided in order to reliably ensure that maximum ratings are not exceeded.

Characteristics

Typical characteristics describe the component behavior under defined operating conditions. The numerical values and diagrams pertain to the component type and are not to be considered as characteristics of an individual component. The minimum and maximum ratings stated for reasons of important quality and application requirements describe the actual spread of the characteristics, whereas spread curves in the diagrams specify the general spread range to be expected. Electrical values are grouped into "static" DC values and "dynamic" AC values.

The **thermal resistance** is closely related to the maximum ratings and, as the upper spread value, is given immediately after the maximum ratings.

The component **package data** is defined by reference to standards sheets and dimensional drawings. Not being a typical component feature, the form of packing is mentioned in the data sheets only in special cases (e.g. if the ordering code varies with the form of packing).

Delivery quality

In this data book the delivery quality is described by technical data, such as maximum ratings and minimum and maximum characteristics.

Acceptable quality level (AQL)

In order to determine the acceptable quality level of delivery lots, the sample tests of attributes are based on AQL values. The testing of attributes is performed in accordance with the single sampling plan for normal inspection, inspection level II, DIN 40080, IEC 410, MIL-STD-105D respectively.

Classification of defects

A defect exists if a component characteristic does not fulfil the value given in the data sheet. Defects are classified according to type and degree of seriousness.

Types of defects

- Damage to package and connections
- Electrical defects

Degree of defects

- A defect exists if a data sheet value exceeds the specified range.
- Inoperatives are components whose functional use as per data sheet is impossible.

AQL table

Type of defect	AQL value
Inoperatives (mechanical and electrical)	0.1
Σ Defects in DC parameters	0.4
Defects in AC parameters	1.5
Σ Damage to package and connections	0.4

AQL values do not describe the actual quality of individual delivery lots, but rather serve to determine — on the basis of the sampling plans — their acceptance or rejection.

As a rule, the average percentage of defectives in shipments is lower than the AQL values.

Packaging
Mounting Instructions

Packaging

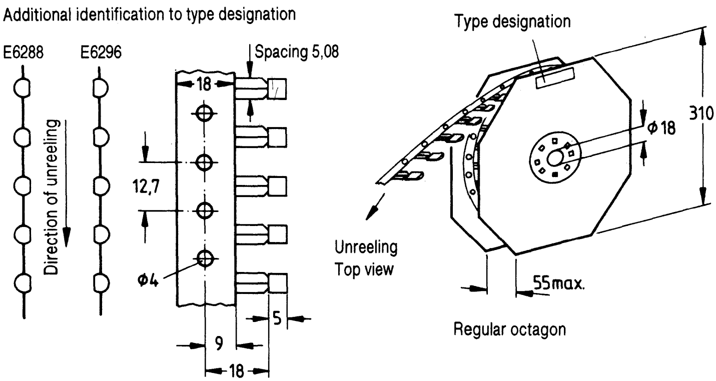
Each packaging unit of regular deliveries has information stamped on it such as the name of the manufacturer, type, quantity, date and place of manufacture, lot identification, ESD sensitivity, matching, etc. These details, which are binding for the contents, identify in uncoded form those types in particular whose size do not permit them to have many details stamped on them and they are important for reporting back if there should ever be any complaints.

Bulk is the general loose form of packaging that enables components to be removed singly, but appropriate stations are needed to direct their supply for automatic placement. This is the normal form of packaging, especially for T-plast and X-plast devices. Taping is available in standardized versions for TO 92 and SMD packages, in the case of diodes with axial leads (DO 35) it is the normal form of packaging.

Below the current forms of taping are summarized. Please inquire for details of dimensional tolerances or variations in how the components are oriented.

Taping: TO 92 package
(Taping of components with radial leads)

The components are held at one end. The position of the flat side of the package, and thus the orientation of the leads, in the direction in which the tape unreels (see drawings) should be noted. The tape dimensions conform to DIN IEC proposed standards. The leads are kinked for an in-line spacing of 200 mil, corresponding to 5 mm (between outer leads). The tape is supplied with 1500 units on reels (octagonal shape) with a layer of paper in between and corrugated cardboard covering; fanfolded tape ("AMMO pack") is available with 1000 units/carton (E 6325 as additional identification to the type designation).



Dimensions in mm

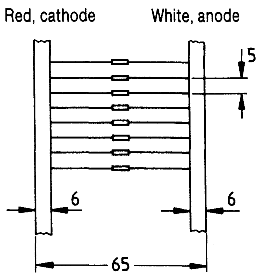
Taping: DO 35 package
(Taping of components with axial leads)

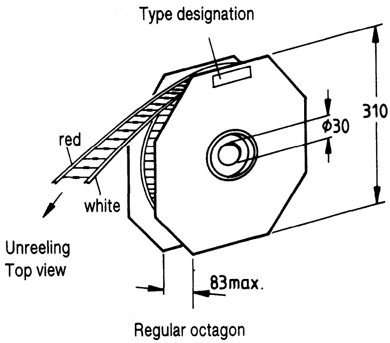
The standard form is a twin tape wound on octagonal cardboard or plastic reels according to DIN IEC 52.133, EIA RS 481 with a maximum complement of 15000 pieces/reel.

Fanfolding of the tape in a carton (AMMO pack) is only used for small sample quantities or by special arrangement; likewise the inclusion of a protective paper layer between the tape layers must be specially contracted for.

The diodes are taped according to polarity; the colored (usually red) adhesive tape marks the cathode end and the white adhesive tape the anode end.

Groups of matched units that should not be mixed (e.g. as in the case of diodes sorted for capacitance tracking) are separated by six empty spaces. The reel is held by a layer of corrugated cardboard.





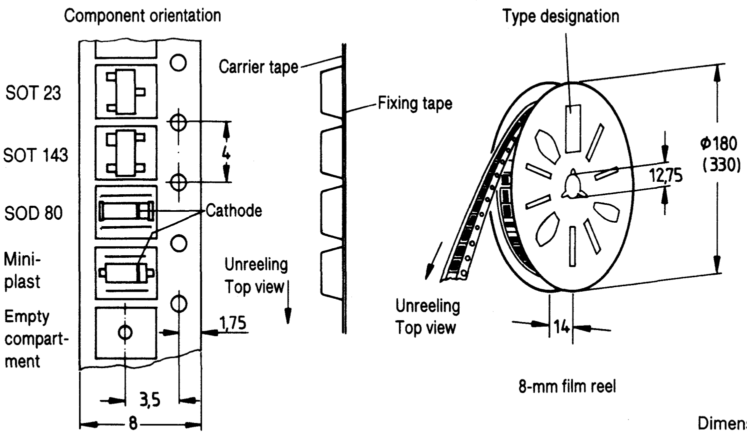
Dimensions in mm

Packaging

Taping: SMD packages (SOT 23, SOT 143, SOD 80, mini-plast)

The components are inserted in cavities of the 8-mm metal or embossed plastic tape oriented in one direction and held by removable fixing tape. The center of the component compartment is perforated. The tape is wound with 3000 (SOD 80: 2500) components on a reel diameter of 18 cm or with 10000 (SOD 80: 7500) components on a reel diameter of 33 cm. The reels are placed in plastic boxes.

This form of packaging conforms to DIN IEC 286-3.



Dimensions in mm

ESD-sensitive components

ESD-sensitive[1] components are supplied in anti-static packaging. The attached warning label calls your attention to the necessity of protecting the components against electrostatic discharge, beginning with the opening of the package.

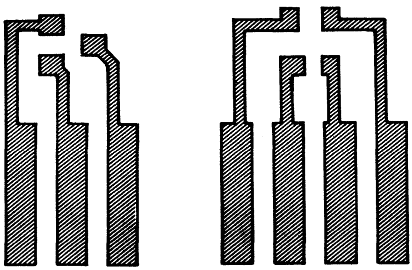
Heat dissipation

The heat caused by the power loss in the active semiconductor region during operation must be dissipated by appropriate circuit layout: in the case of small-signal types described here, the PC board plays the primary role in dissipating and distributing the heat.

The maximum values of thermal resistance R_{thJA} given in the data sheets are determined for T-plast, X-plast, TO 92 and diodes with reference to ambient air with only slight heat dissipation through the leads; they can quite easily be taken for the usual mounting methods.

The R_{th} of SMDs, e.g. SOT 23 and SOT 143, is also measured with reference to ambient air on ceramic test substrates (see illustration). For mounting SMDs on PC boards the higher thermal resistance (by approx. 90 K/W) has to be considered.

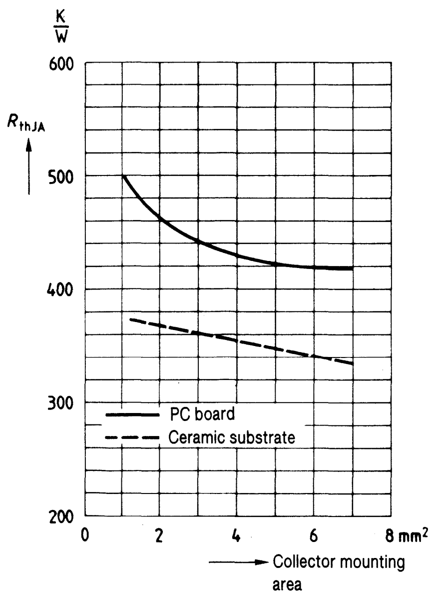
Al_2O_3 test substrate, metallization



SOT 23 SOT 143

Ceramic dimensions: 16,7 mm × 15 mm × 0,7 mm

Thermal resistance SOT 23, SOT 143



[1] ESD = electrostatic discharge

Mechanical stress

During circuit assembly it has to be ensured that the components are not subjected to mechanical stress. The anchoring of the leads in the package is especially endangered, and if it is loosened, a component may very well fail.

- Bending of the leads requires mechanical relief between the point of bending and the package. Bending directly at the package perpendicular to the plane of the lead frame is admissible with T-plast and X-plast (if it is done gently).
- Band-shaped leads (e.g. with T-plast) are not to be bent in the lead frame plane.
- Repeated bending in the same place is not permissible.

Soldering

Before starting the soldering, make sure the component is attached to the PC board in a fashion which does not exert undue mechanical stress on the leads. The adhesives that are used for wave soldering of SMDs must be neutral in their chemical and electrical reaction.

Components should not be subjected to excessive temperature/time stresses during soldering. The following tables provide the guidelines.

Recommended maximum soldering time for DO 35

Free lead length	1.5	2.5	5	mm
Soldering temperature 245 °C	4	6	13	s
Soldering temperature 260 °C	3.5	4	10	s
Iron soldering 300 °C	3	3.5	8	s

Recommended maximum soldering time for T-plast, X-plast, TO 92

Free lead length	0.5	1.5	5	mm
Soldering temperature 245 °C	4	5	10	s
Soldering temperature 260 °C	3	5	5	s
Iron soldering 300 °C	2.5	3	5	s

Recommended maximum soldering time for SMDs

Wave soldering 260 °C, 8 s

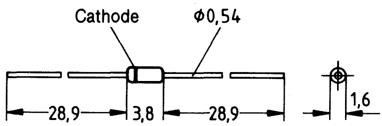
Diodes

Silicon Switching Diodes

BA 243
BA 244

- For VHF band switching in TV tuners

DO 35 DHD



Dimensions in mm

Type	BA 243	BA 244
Ordering code	Q62702-A521	Q62702-A421
Color	yellow	

Maximum ratings

Reverse voltage	V_R	35	V
Forward current $T_A \leq 60\,°C$	I_F	100	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤400	K/W

Characteristics (T_A = 25 °C)

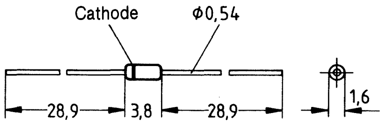
		min	typ	max	
Forward voltage I_F = 100 mA	V_F	–	–	1	V
Reverse current V_R = 15 V	I_R	–	–	50	nA
Diode capacitance V_R = 15 V, f = 1 MHz	C_T	–	1,3	2	pF
Forward resistance I_F = 10 mA, f = 100 MHz	r_f				
BA 243		–	0,5	1	Ω
BA 244		–	0,4	0,5	Ω
Reverse resistance V_R = 1 V, f = 100 MHz	$1/g_p$	–	100	–	kΩ
Series inductance	L_s	–	2,5	–	nH

Silicon Switching Diodes

BA 243 S
BA 244 S

- For VHF band switching in TV tuners
- Low forward resistance and low diode capacitance

DO 35 DHD



Dimensions in mm

Type	BA 243 S	BA 244 S
Ordering code	Q62702-A607	Q62702-A618
Color	yellow	

Maximum ratings

Reverse voltage	V_R	35	V
Forward current $T_A \leq 60\,°C$	I_F	100	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤400	K/W

Characteristics (T_A = 25 °C)

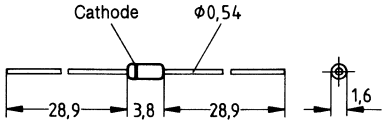
		min	typ	max	
Forward voltage I_F = 100 mA	V_F	—	—	1	V
Reverse current V_R = 15 V	I_R	—	—	50	nA
Diode capacitance, f = 1 MHz	C_T				
V_R = 15 V		—	1,3	—	pF
5 V		—	—	1,5	pF
1 V		—	1,85	—	pF
Forward resistance, f = 100 MHz	r_f				
BA 243 S: I_F = 10 mA		—	—	0,7	Ω
2 mA		—	—	2	Ω
BA 244 S: I_F = 10 mA		—	—	0,5	Ω
2 mA		—	1	—	Ω
Reverse resistance V_R = 1 V, f = 100 MHz	$1/g_p$	—	100	—	kΩ
Series inductance	L_s	—	2,5	—	nH

Silicon Switching Diodes

BA 282
BA 283

- Low-loss VHF band switch for TV tuners

DO 35 DHD



Dimensions in mm

Type	BA 282	BA 283
Ordering code	Q62702-A428	Q62702-A429
Color	yellow	

Maximum ratings

Reverse voltage	V_R	35	V
Forward current $T_A \leq 60\,°C$	I_F	100	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–55...+150	°C

Thermal resistance

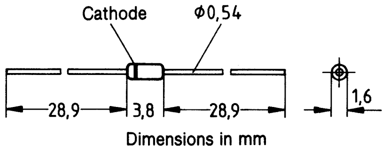
Junction — ambient	R_{thJA}	≤400	K/W

Characteristics (T_A = 25 °C)

		min	typ	max	
Forward voltage I_F = 100 mA	V_F	—	—	1	V
Reverse current V_R = 20 V	I_R	—	—	50	nA
Diode capacitance, f = 1 MHz	C_T				
BA 282: V_R = 1 V		—	—	1,5	pF
3 V		—	—	1,2	pF
BA 283: V_R = 1 V		—	—	1,5	pF
3 V		—	—	1	pF
Forward resistance, f = 100 MHz	r_f				
BA 282: I_F = 3 mA		—	—	0,7	Ω
10 mA		—	—	0,5	Ω
BA 283: I_F = 3 mA		—	—	1,2	Ω
10 mA		—	—	0,9	Ω
Reverse resistance V_R = 1 V, f = 100 MHz	$1/g_p$	—	100	—	kΩ
Series inductance	L_s	—	2,5	—	nH

- Low-loss RF switch for use at frequencies above 10 MHz, especially in TV tuners

DO 35 DHD



Type	BA 284
Ordering code	Q62702-A632
Color	yellow

Maximum ratings

Reverse voltage	V_R	35	V
Forward current $T_A \leq 60\,°C$	I_F	100	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65...+150	°C

Thermal resistance

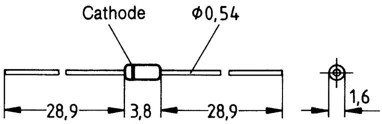
Junction — ambient	R_{thJA}	≤400	K/W

Characteristics (T_A = 25 °C)

		min	typ	max	
Forward voltage I_F = 100 mA	V_F	—	—	1	V
Reverse current V_R = 20 V	I_R	—	—	50	nA
Diode capacitance, f = 1 MHz	C_T				
V_R = 1 V		—	1	—	pF
20 V		—	0,8	1	pF
Forward resistance, f = 100 MHz	r_f				
I_F = 3 mA		—	0,75	—	Ω
10 mA		—	0,45	0,6	Ω
Reverse resistance, V_R = 1 V	$1/g_p$				
f = 1 MHz		1	—	—	MΩ
100 MHz		—	100	—	kΩ
Series inductance	L_s	—	2,5	—	nH

- Current-controlled RF resistor for switching and attenuation applications
- Frequency range 1 MHz ... 1 GHz

DO 35 DHD



Dimensions in mm

Type	BA 389
Ordering code	Q62702-A732
Color	yellow

Maximum ratings

Reverse voltage	V_R	30	V
Forward current	I_F	50	mA
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65... +150	°C

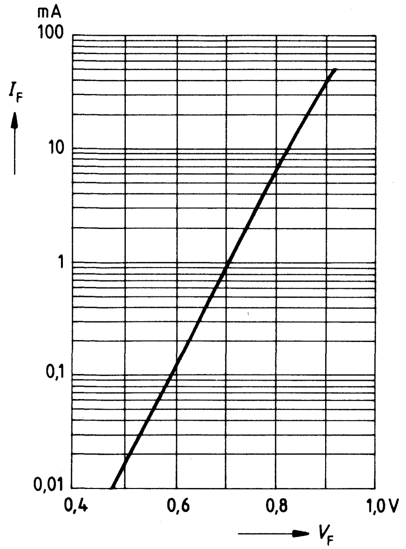
Thermal resistance

Junction — ambient	R_{thJA}	≤400	K/W

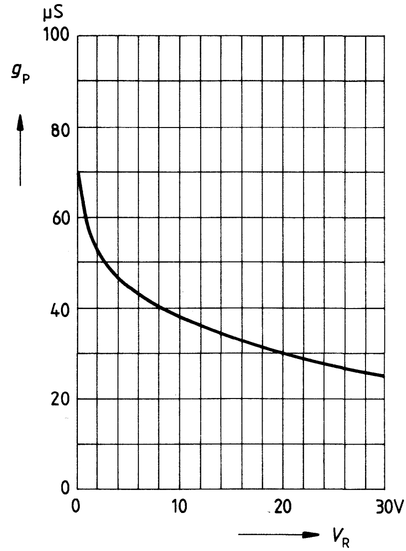
Characteristics (T_A = 25 °C)

		min	typ	max	
Forward voltage I_F = 50 mA	V_F	—	—	1	V
Reverse current V_R = 30 V	I_R	—	—	50	nA
Diode capacitance	C_T				
V_R = 10 V, f = 1 MHz		—	0,55	—	pF
0 V, 100 MHz		—	0,35	0,5	pF
Forward resistance, f = 100 MHz	r_f				
I_F = 1,5 mA		—	25	40	Ω
10 mA		—	5	7,5	Ω
Zero bias conductance V_R = 0 V, f = 100 MHz	g_p	—	70	—	µS
Series inductance	L_s	—	2,5	—	nH

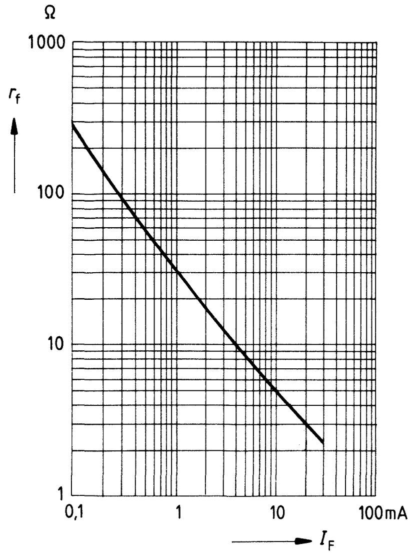
Forward characteristic $I_F = f(V_F)$



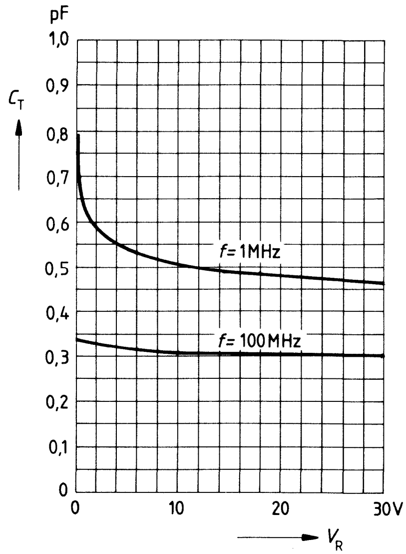
Parallel conductance $g_p = f(V_R)$



Forward resistance $r_f = f(I_F)$
$f = 100$ MHz



Diode capacitance $C_T = f(V_R)$

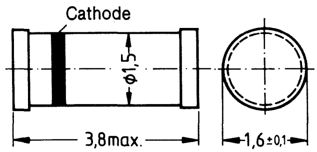


Silicon PIN Diodes

BA 682
BA 683

Preliminary data **SOD 80**

- Low-loss VHF band switches in TV tuners
- Miniature glass case for surface mounting (SMD)



Dimensions in mm

Type[1]	BA 682	BA 683
Ordering code	taped: Q62702-A723	taped: Q62702-A145

Maximum ratings

Reverse voltage	V_R	35	V
Forward current	I_F	50	mA
Operating temperature	T_{op}	100	°C
Storage temperature range	T_{stg}	–55...+150	°C

Thermal resistance

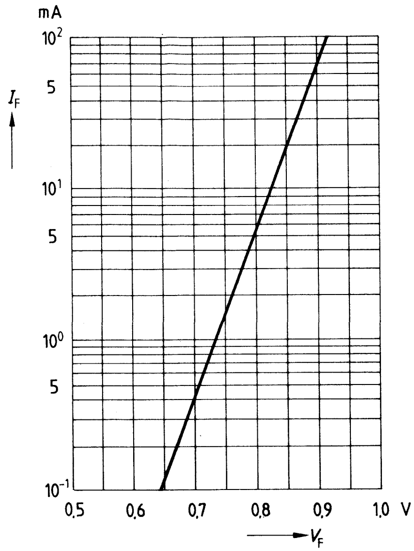
Junction — ambient	R_{thJA}	≤400	K/W

[1] The type designation is printed on the package label.

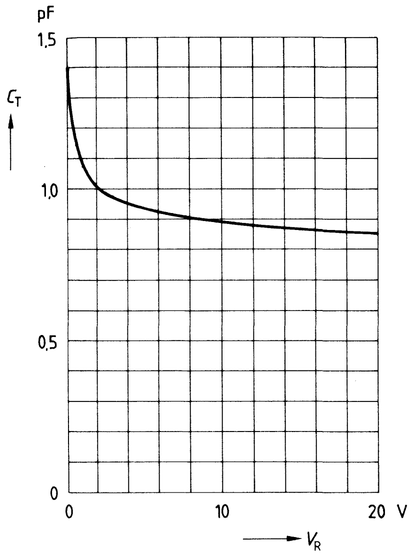
Characteristics (T_A = 25 °C)

		min	typ	max	
Forward voltage I_F = 50 mA	V_F	—	—	1	V
Reverse current V_R = 20 V	I_R	—	—	50	nA
Diode capacitance, f = 1 MHz	C_T				
BA 682: V_R = 1 V		—	—	1,5	pF
3 V		—	—	1,2	pF
BA 683: V_R = 1 V		—	—	1,5	pF
3 V		—	—	1,0	pF
Forward resistance, f = 100 MHz	r_f				
BA 682: I_F = 3 mA		—	—	0,7	Ω
10 mA		—	—	0,5	Ω
BA 683: I_F = 3 mA		—	—	1,2	Ω
10 mA		—	—	0,9	Ω
Reverse resistance V_R = 1 V, f = 100 MHz	$1/g_p$	—	100	—	kΩ
Series inductance	L_s	—	2	—	nH

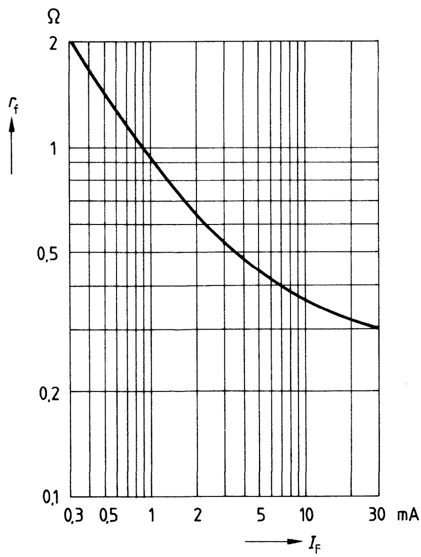
Forward current $I_F = f(V_F)$
$T_A = 25\,°C$



Diode capacitance $C_T = f(V_R)$
$f = 1$ MHz

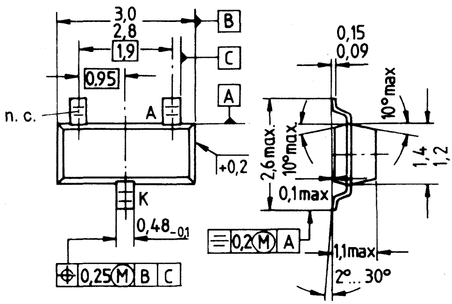


Forward resistance $r_f = f(I_F)$
$f = 100$ MHz



- Current-controlled RF resistor
- Frequency range:
  1 MHz ... 2 GHz
- Designed for antenna switching in TV-sat tuners
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BA 885	
Ordering code	bulk: Q62702-A742	taped: Q62702-A608
Marking	PA	

Maximum ratings

Reverse voltage	V_R	50	V
Forward current	I_F	50	mA
Operating temperature	T_{op}	100	°C
Storage temperature range	T_{stg}	−65...+150	°C

Thermal resistance

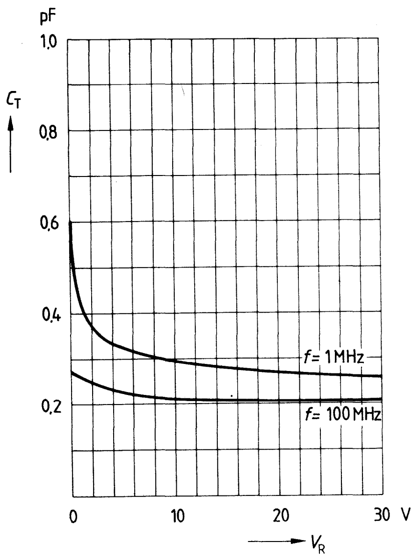
Junction — ambient	R_{thJA}	≤450	K/W[1]

[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm.

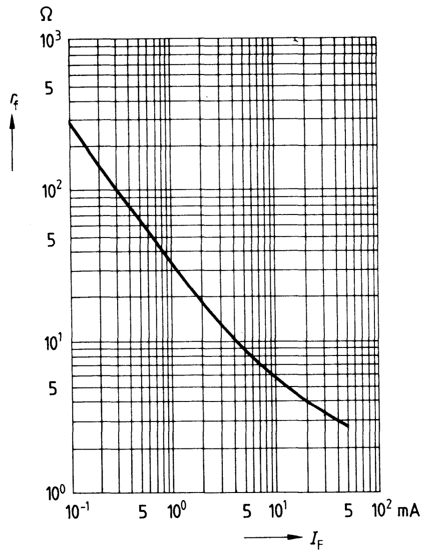
Characteristics (T_A = 25 °C)

		min	typ	max	
Forward voltage I_F = 50 mA	V_F	—	—	1,1	V
Reverse current V_R = 30 V	I_R	—	—	50	nA
Diode capacitance V_R = 10 V, f = 1 MHz 0 V, 100 MHz	C_T		0,3 0,23	— 0,5	pF pF
Forward resistance, f = 100 MHz I_F = 1,5 mA 10 mA	r_f	— —	22 5	40 7	Ω Ω
Zero bias conductance V_R = 0, f = 100 MHz	g_p	—	70	—	µS

Diode capacitance $C_T = f(V_R)$
f = 1 MHz/100 MHz

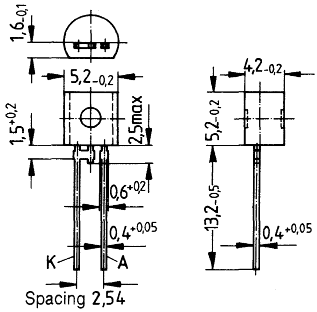


Forward resistance $r_f = f(I_F)$
f = 100 MHz



- For AM tuning applications
- Specified tuning range 1 ... 8.5 V

TO 92



Dimensions in mm

Type	BB 112
Ordering code	Q62702-B240

Maximum ratings

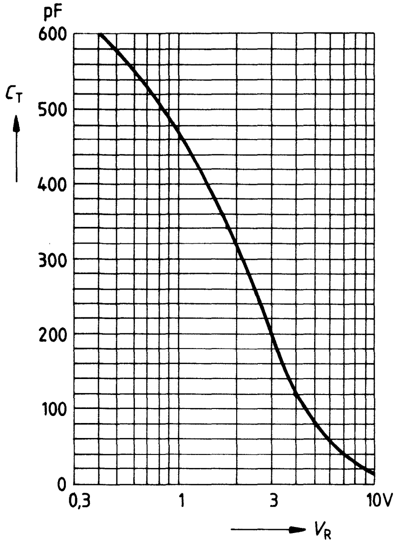
Reverse voltage	V_R	12	V
Forward current $T_A \leq 60\,°C$	I_F	50	mA
Operating temperature range	T_{op}	– 55 ... + 85	°C

Characteristics (T_A = 25 °C)

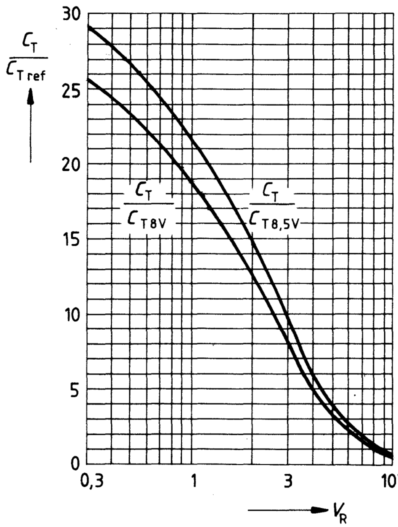
DC characteristics		**min**	**typ**	**max**	
Reverse current	I_R				
V_R = 10 V		–	–	50	nA
10 V, T_A = 60 °C		–	–	200	nA

AC characteristics					
Diode capacitance, f = 1 MHz	C_T				
V_R = 1 V		440	470	520	pF
8,5 V		16,5	–	29	pF
Capacitance ratio V_R = 1 V/8,5 V	$\frac{C_T 1}{C_T 8,5}$	18	–	–	–
Series resistance V_R = 1 V, f = 0,5 MHz	r_s	–	1,4	–	Ω
Q factor V_R = 1 V, f = 0,5 MHz	Q	–	480	–	–
Temperature coefficient of diode capacitance V_R = 1 V, f = 1 MHz	TC_C	–	500	–	ppm/K
Capacitance matching V_R = 1...8,5 V	$\frac{\Delta C_T}{C_T}$	–	–	3	%

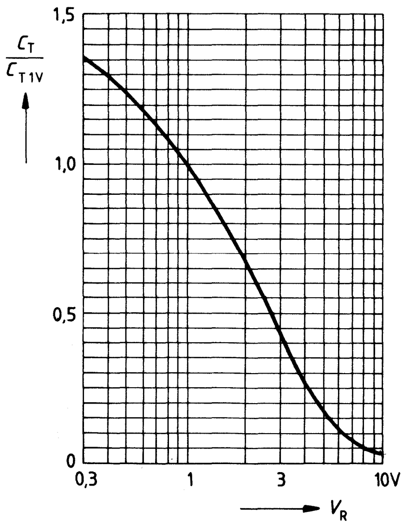
Diode capacitance $C_T = f(V_R)$



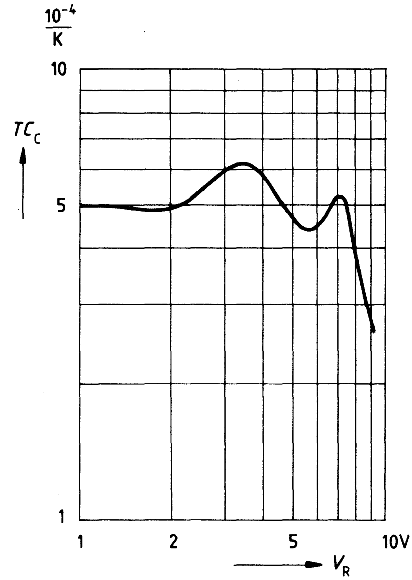
Capacitance ratio
$C_T/C_{Tref} = f(V_R)$



Capacitance ratio
$C_T/C_{T1\,V} = f(V_R)$



Temperature coefficient of junction capacitance
$TC_C = f(V_R)$

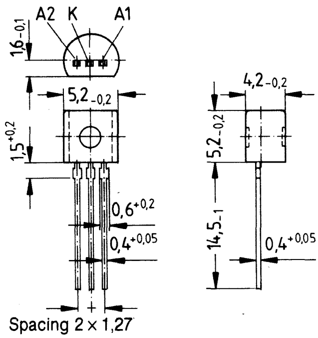


Silicon Dual Tuning Diode

BB 204

- For FM tuners
- Monolithic chip with common cathode for perfect tracking of both diodes
- Uniform "square law" characteristics
- Ideal Hifi tuning device when used in low-distortion, back-to-back configuration
- Capacitance subgroups available

TO 92



Dimensions in mm

Type	BB 204	
Ordering code	Q62702-B58-X6	Q62702-B57-X5
Color	blue	green

Maximum ratings per diode

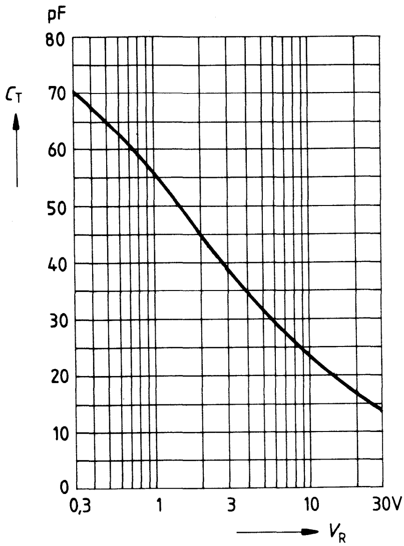
Reverse voltage	V_R	30	V
Peak reverse voltage	V_{RM}	32	V
Forward current	I_F	50	mA
$T_A \leq 60\,°C$			
Storage temperature range	T_{stg}	−55...+100	°C

Characteristics per diode ($T_A = 25\ °C$)

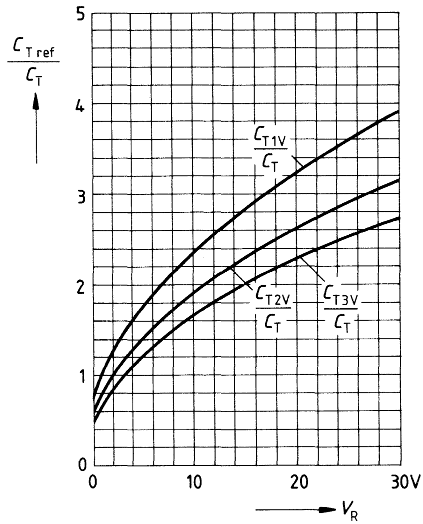
DC characteristics		min	typ	max	
Breakdown voltage $I_R = 10\ \mu A$	$V_{(BR)}$	32	—	—	V
Reverse current $V_R = 30\ V$ $30\ V,\ T_A = 60\ °C$	I_R	 — —	 — —	 20 0,2	 nA µA

AC characteristics					
Diode capacitance, $f = 1\ MHz$ $V_R = 3\ V$, green 3 V, blue $V_R = 30\ V$, green 30 V, blue	C_T	 34 37 — —	 — — 13,7 14,4	 39 42 — —	 pF pF pF pF
Capacitance ratio, $f = 1\ MHz$ $V_R = 3\ V,\ 30\ V$	$\frac{C_T3}{C_T30}$	2,55	2,7	2,8	—
Series resistance $C_T = 38\ pF,\ f = 100\ MHz$	r_s	—	0,2	0,4	Ω
Q factor $C_T = 38\ pF,\ f = 100\ MHz$	Q	100	200	—	—
Temperature coefficient of diode capacitance $V_R = 3\ V,\ f = 1\ MHz$	TC_C	—	300	—	ppm/K

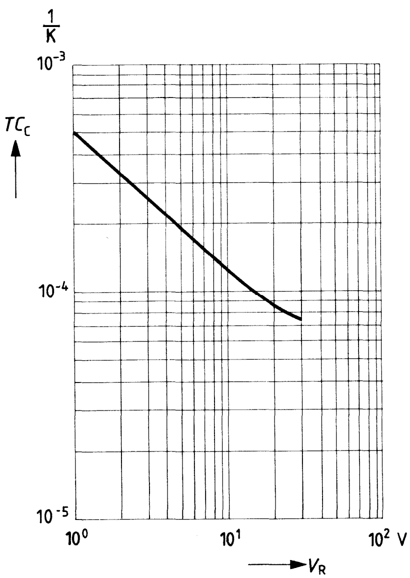
Diode capacitance $C_T = f(V_R)$
per diode, f = 1 MHz



Capacitance ratio $C_{Tref}/C_t = f(V_R)$
per diode; V_{ref} = 1 V, 2 V, 3 V; f = 1 MHz



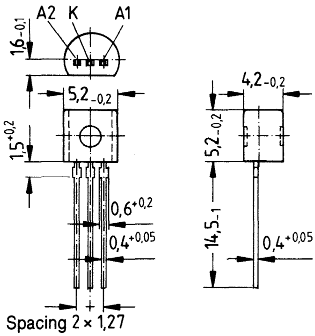
Temperature coefficient of diode capacitance $TC_C = f(V_R)$
per diode, f = 1 MHz



Silicon Dual Tuning Diode — BB 304

- For FM tuners
- Monolithic chip with common cathode for perfect tracking of both diodes
- Uniform "square law" characteristics
- Ideal Hifi tuning device when used in low-distortion, back-to-back configuration
- Color-coded capacitance subgroups available (see next page)

TO 92



Dimensions in mm

Type	BB 304
Ordering code	Q62702-B84

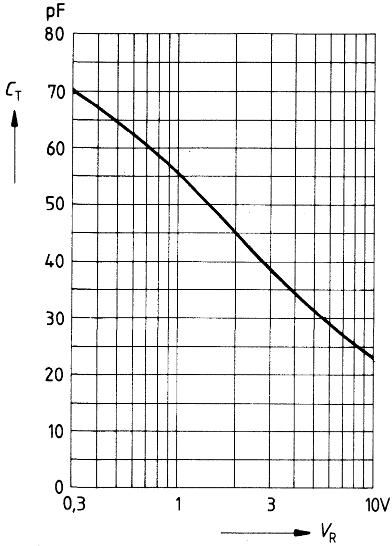
Maximum ratings per diode

Reverse voltage	V_R	30	V
Peak reverse voltage	V_{RM}	32	V
Forward current $T_A \leq 60\,°C$	I_F	50	mA
Storage temperature range	T_{stg}	−55...+100	°C

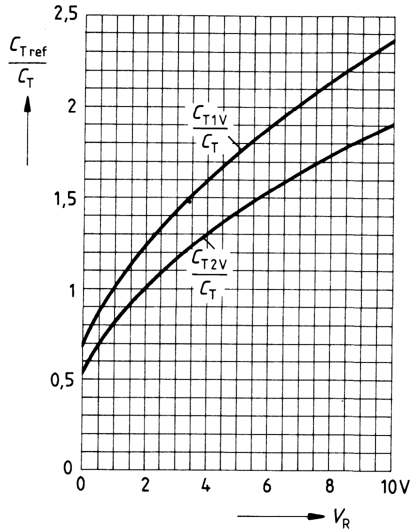
Characteristics per diode (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 30 V		—	—	20	nA
30 V, T_A = 60 °C		—	—	0,2	µA
Diode capacitance V_R = 2 V, f = 1 MHz	C_T	42	—	47,5	pF
Capacitance ratio V_R = 2 V, 8 V, f = 1 MHz	$\frac{C_T2}{C_T8}$	1,65	—	1,75	—
Series resistance C_T = 38 pF, f = 100 MHz	r_s	—	0,2	0,4	Ω
Q factor C_T = 38 pF, f = 100 MHz	Q	100	200	—	—
Capacitance subgroups V_R = 2 V, f = 1 MHz	C_T				
Subgroups: red		42	—	43,5	pF
yellow		43	—	44,5	pF
white		44	—	45,5	pF
green		45	—	46,5	pF
blue		46	—	47,5	pF

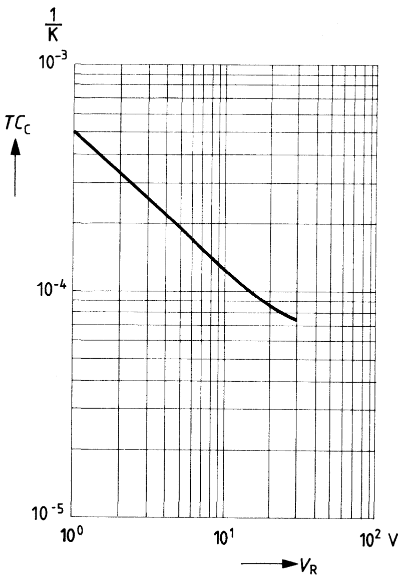
Diode capacitance $C_T = f(V_R)$
per diode, f = 1 MHz



Capacitance ratio $C_{Tref}/C_T = f(V_R)$
per diode; V_{ref} = 1 V, 2 V; f = 1 MHz



Temperature coefficient of diode capacitance $TC_C = f(V_R)$
per diode, f = 1 MHz



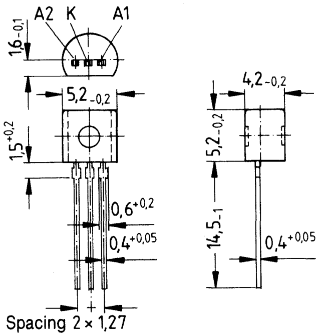
Silicon Dual Tuning Diode

BB 314

Preliminary data

TO 92

- Designed for use in FM tuners with extended frequency range
- Special implantation for high capacitance ratio
- Monolithic chip for perfect tracking of both diodes; common cathode
- Capacitance subgroups available upon request



Dimensions in mm

Type	BB 314
Ordering code	Q62702-B397

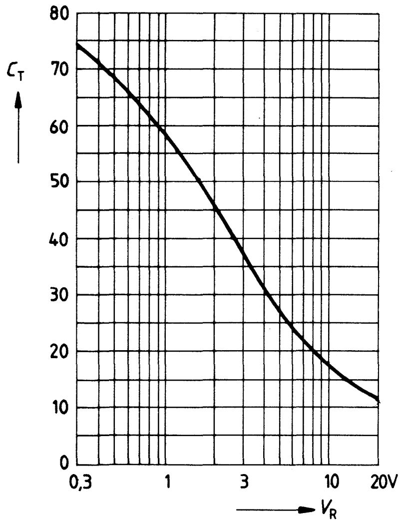
Maximum ratings per diode

Reverse voltage	V_R	18	V
Peak reverse voltage	V_{RM}	20	V
Forward current $T_A \leq 60\,°C$	I_F	50	mA
Storage temperature range	T_{stg}	−55... +100	°C

Characteristics per diode (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 16 V		—	—	20	nA
16 V, T_A = 60 °C		—	—	0,2	µA
Diode capacitance, f = 1 MHz	C_T				
V_R = 2 V		—	44,75	—	pF
8 V		—	20,3	—	pF
Capacitance ratio V_R = 2 V, 8 V; f = 1 MHz	$\frac{C_T2}{C_T8}$	—	2,2	—	—

Diode capacitance $C_T = f(V_R)$
per diode, f = 1 MHz

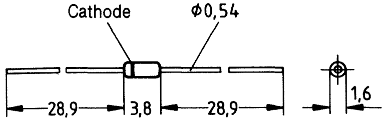


Silicon Tuning Diode

BB 409

- For VHF tuners

DO 35 DHD



Dimensions in mm

Type	BB 409
Ordering code	Q62702-B112
Color	green

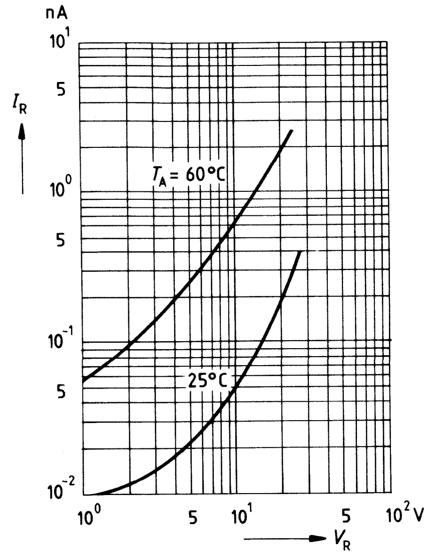
Maximum ratings

Reverse voltage	V_R	28	V
Peak reverse voltage	V_{RM}	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Storage temperature range	T_{stg}	–55...+150	°C

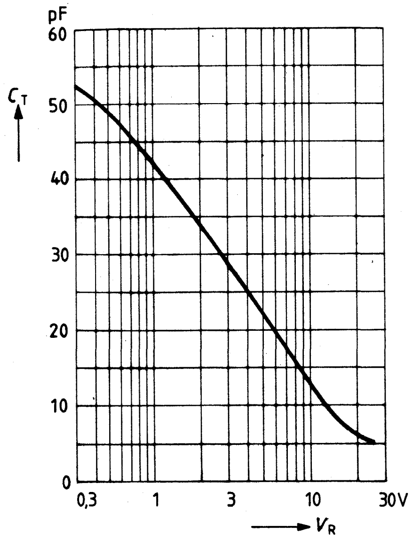
Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 28 V		–	–	50	nA
28 V, T_A = 60 °C		–	–	0,5	µA
Diode capacitance, f = 1 MHz	C_T				
V_R = 3 V		26	–	32	pF
25 V		4,5	–	5,6	pF
Capacitance ratio V_R = 3 V, 25 V; f = 1 MHz	$\frac{C_T 3}{C_T 25}$	5	–	6,5	–
Capacitance matching V_R = 1 V...28 V	$\frac{\Delta C_T}{C_T}$	–	–	3	%
Series resistance C_T = 12 pF, f = 100 MHz	r_s	–	0,3	–	Ω
Q factor	Q				
V_R = 3 V, f = 50 MHz		–	280	–	–
25 V, 200 MHz		–	600	–	–
Series inductance	L_s	–	3	–	nH
Temperature coefficient of diode capacitance, f = 1 MHz	TC_C				
V_R = 3 V			$2{,}5 \cdot 10^{-4}$		1/K
25 V			$0{,}8 \cdot 10^{-4}$		1/K

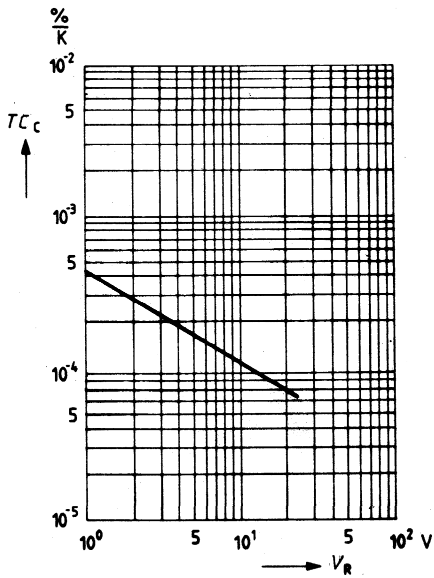
Reverse current $I_R = f(V_R)$



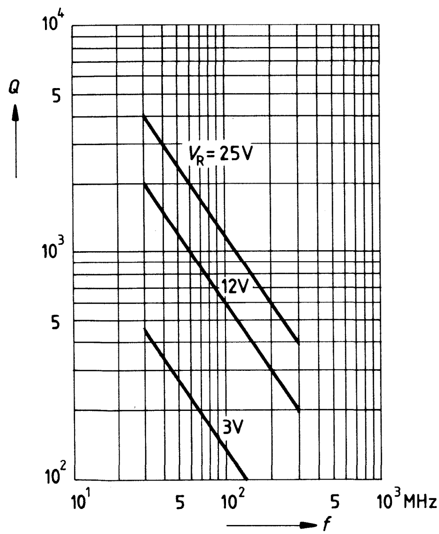
Diode capacitance $C_T = f(V_R)$



Temperature coefficient of diode capacitance $TC_C = f(V_R)$



Q factor $Q = f(f)$
V_R = Parameter

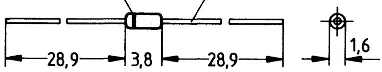


Silicon Tuning Diodes

BB 505 B
BB 505 G

- For UHF and VHF tuners

DO 35 DHD



Dimensions in mm

Type	BB 505 B	BB 505 G
Ordering code	Q62702-B37	Q62702-B270
Color	orange	

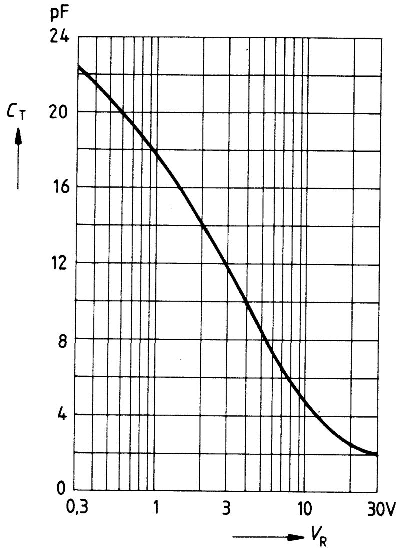
Maximum ratings

Reverse voltage	V_R	28	V
Peak reverse voltage	V_{RM}	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature range	T_{op}	−55...+100	°C
Storage temperature range	T_{stg}	−55...+150	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 28 V		—	—	20	nA
28 V, T_A = 60 °C		—	—	0,5	µA
Diode capacitance, f = 1 MHz	C_T				
BB 505 B: V_R = 1 V		—	17,5	—	pF
28 V		1,85	—	2,25	pF
BB 505 G: V_R = 1 V		—	17,5	—	pF
28 V		1,8	—	2,4	pF
Capacitance ratio	$\frac{C_T 1}{C_T 28}$				
V_R = 1 V, 28 V; f = 1 MHz					
BB 505 B		7,7	—	9,4	—
BB 505 G		7,5	—	9,5	—
Capacitance matching V_R = 0,5 V...28 V	$\frac{\Delta C_T}{C_T}$	—	—	3	%
Series resistance	r_s				
C_T = 9 pF, f = 470 MHz					
BB 505 B		—	—	0,7	Ω
BB 505 G		—	—	1	Ω
Series inductance	L_s	—	3	—	nH
Temperature coefficient of diode capacitance					
V_R = 1 V, f = 1 MHz	TC_C	—	480	—	ppm/K

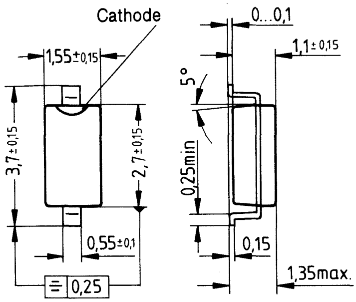
Diode capacitance $C_T = f(V_R)$
f = 1 MHz



Preliminary data

Mini-plast

- For UHF and VHF TV tuners
- Miniature plastic package for surface mounting (SMD)



Dimensions in mm

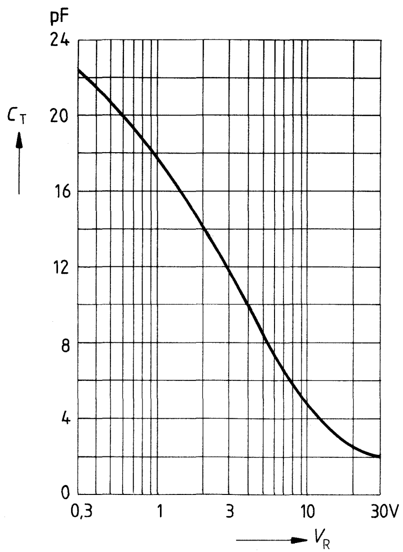
Type	BB 515 B	BB 515 G
Ordering code	Q62702-B398	Q62702-B399

Maximum ratings

Reverse voltage	V_R	28	V
Peak reverse voltage	V_{RM}	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature range	T_{op}	−55...+100	°C
Storage temperature range	T_{stg}	−55...+100	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 28 V		—	—	20	nA
28 V, T_A = 60 °C		—	—	0,2	µA
Diode capacitance, f = 1 MHz	C_T				
BB 515 B: V_R = 1 V		—	17,7	—	pF
28 V		1,85	—	2,25	pF
BB 515 G: V_R = 1 V		—	17,7	—	pF
28 V		1,8	—	2,4	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T1}{C_T28}$				
BB 515 B		8	—	9,5	—
BB 515 G		7,5	—	9,5	—
Capacitance matching V_R = 0,5 V...28 V	$\frac{\Delta C_T}{C_T}$	—	—	3	%
Series resistance C_T = 9 pF, f = 470 MHz	r_s				
BB 515 B		—	0,55	—	Ω
BB 515 G		—	—	1	Ω
Series inductance	L_s	—	2,5	—	nH



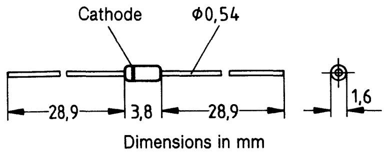
Diode capacitance $C_T = f(V_R)$
f = 1 MHz

Silicon Tuning Diodes

BB 609 A
BB 609 B

- Especially for tuning of extended frequency bands in VHF and CATV tuners

DO 35 DHD



Type	BB 609 A	BB 609 B
Ordering code	Q62702-B196	Q62702-B197
Color	white	

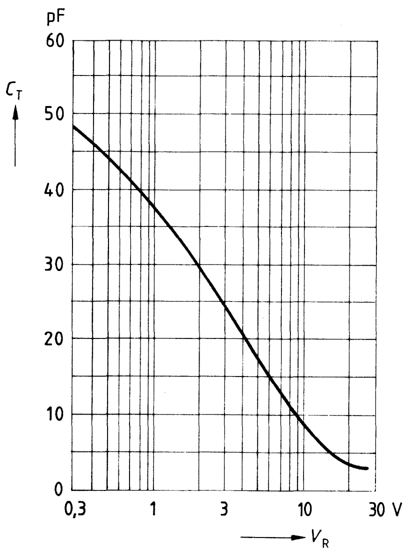
Maximum ratings

Peak reverse voltage	V_{RM}	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature range	T_{op}	−55...+100	°C
Storage temperature range	T_{stg}	−55...+150	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 30 V		—	—	20	nA
30 V, T_A = 60 °C		—	—	200	nA
Diode capacitance, f = 1 MHz	C_T				
BB 609 A: V_R = 1 V		32,5	—	—	pF
28 V		2,5	—	3	pF
BB 609 B: V_R = 1 V		33,5	—	—	pF
28 V		2,8	—	3,2	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T1}{C_T28}$	12	—	15	—
Capacitance matching V_R = 1 V...28 V, f = 1 MHz	$\frac{\Delta C_T}{C_T}$	—	—	2,5	%
Series resistance C_T = 12 pF, f = 100 MHz	r_s	—	0,7	1	Ω
Series inductance	L_s	—	3	—	nH

Diode capacitance $C_T = f(V_R)$
f = 1 MHz

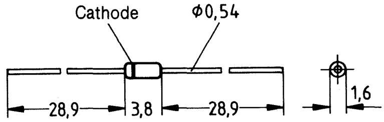


Silicon Tuning Diode **BB 610**

Preliminary data

- For Hyperband TV tuners, Bd I
- Capacitance ratio > 19

DO 35 DHD



Dimensions in mm

Type	BB 610
Ordering code	Q62702-B400

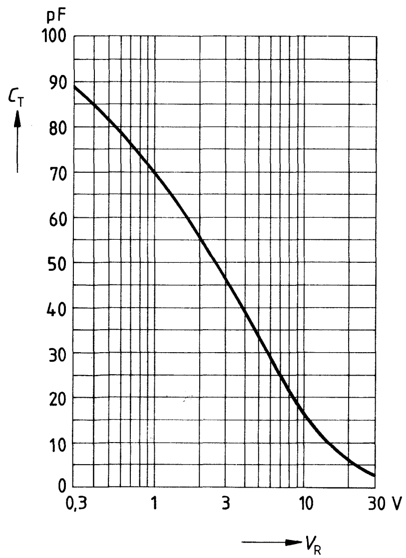
Maximum ratings

Reverse voltage	V_R	30	V
Forward current	I_F	20	mA
$T_A \leq 60\,°C$			
Operating temperature range	T_{op}	$-55...+100$	°C
Storage temperature range	T_{stg}	$-55...+150$	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 30 V		—	—	20	nA
30 V, T_A = 60 °C		—	—	200	nA
Diode capacitance, f = 1 MHz	C_T				
V_R = 1 V		—	69	—	pF
28 V		—	3,35	—	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T1}{C_T28}$	19	—	—	—
Capacitance matching V_R = 1 V...28 V, f = 1 MHz	$\frac{\Delta C_T}{C_T}$	—	—	2,5	%
Series resistance	r_s	—	1,3	—	Ω

Diode capacitance $C_T = f(V_R)$
f = 1 MHz



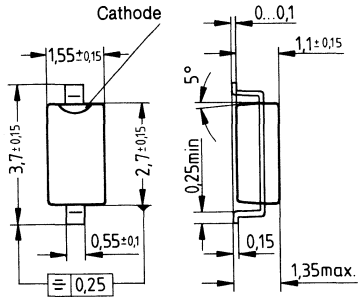
Silicon Tuning Diodes

BB 619 A
BB 619 B

Preliminary data

Mini-plast

- For tuning of extended frequency bands in VHF TV tuners
- Miniature plastic package for surface mounting (SMD)



Dimensions in mm

Type	BB 619 A	BB 619 B
Ordering code	Q62702-B401	Q62702-B402

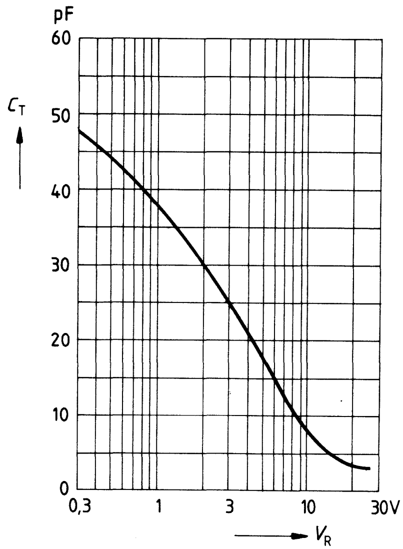
Maximum ratings

Reverse voltage	V_R	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature range	T_{op}	−55...+100	°C
Storage temperature range	T_{stg}	−55...+100	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 30 V		—	—	20	nA
30 V, T_A = 60 °C		—	—	200	nA
Diode capacitance, f = 1 MHz	C_T				
BB 619 A: V_R = 1 V		—	37,5	—	pF
28 V		2,5	—	3	pF
BB 619 B: V_R = 1 V		—	39	—	pF
28 V		2,8	—	3,2	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T1}{C_T28}$	12	—	—	—
Capacitance matching V_R = 1 V...28 V, f = 1 MHz	$\frac{\Delta C_T}{C_T}$	—	—	2,5	%
Series resistance	r_s	—	0,65	—	Ω
Series inductance	L_s	—	2,5	—	nH

Diode capacitance $C_T = f(V_R)$
f = 1 MHz

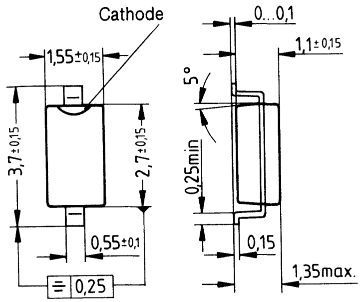


Silicon Tuning Diode

Preliminary data

- For Hyperband TV tuners, Bd I
- Capacitance ratio > 19
- Miniature plastic package for surface mounting (SMD)

Mini-plast



Dimensions in mm

Type	BB 620
Ordering code	Q62702-B403

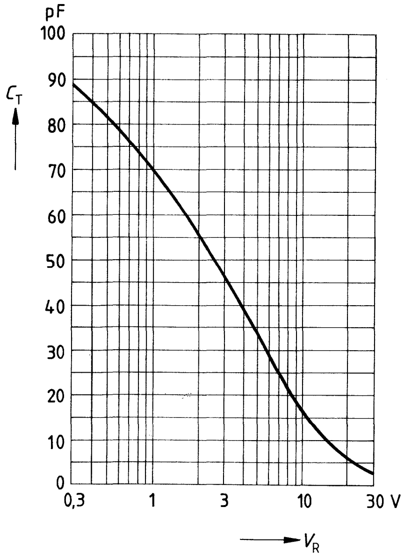
Maximum ratings

Reverse voltage	V_R	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature range	T_{op}	−55...+100	°C
Storage temperature range	T_{stg}	−55...+100	°C

Characteristics (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 30 V		—	—	20	nA
30 V, T_A = 60 °C		—	—	200	nA
Diode capacitance, f = 1 MHz	C_T				
V_R = 1 V		—	69	—	pF
28 V		—	3,35	—	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T 1}{C_T 28}$	19	—	—	—
Capacitance matching V_R = 1 V…28 V, f = 1 MHz	$\frac{\Delta C_T}{C_T}$	—	—	2,5	%
Series resistance	r_s	—	1,3	—	Ω

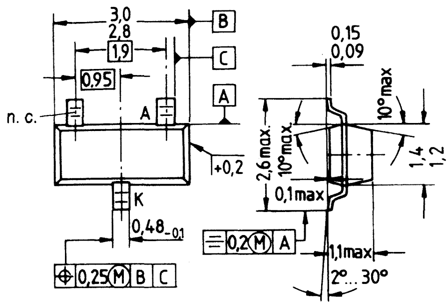
Diode capacitance $C_T = f(V_R)$
f = 1 MHz



Silicon Tuning Diode **BB 801**

Preliminary data **SOT 23**

- Frequency range up to 2 GHz; special design for use in TV-sat indoor units
- High capacitance ratio
- Miniature plastic package for surface mounting (SMD)



Dimensions in mm

Type	BB 801
Ordering code	bulk: Q62702-B346
Marking	UF

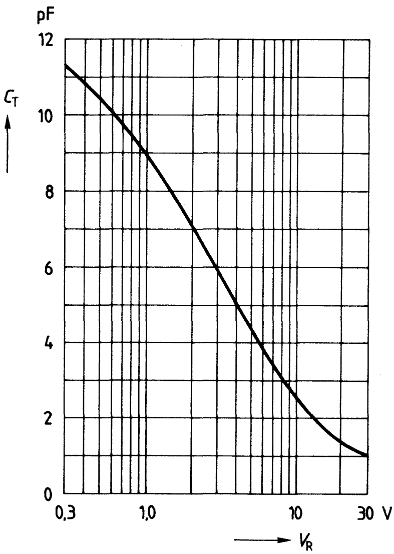
Maximum ratings

Reverse voltage	V_R	28	V
Peak reverse voltage	V_{RM}	30	V
Forward current $T_A \leq 60\,°C$	I_F	20	mA
Operating temperature	T_{op}	100	°C
Storage temperature range	T_{stg}	−65... +150	°C

Characteristics (T_A = 25 °C)

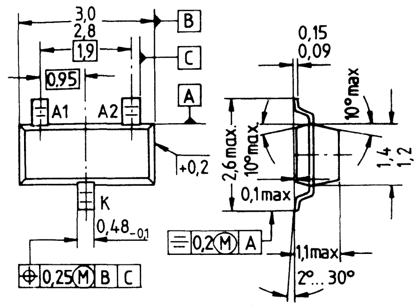
		min	typ	max	
Reverse current	I_R				
V_R = 28 V		—	—	20	nA
28 V, T_A = 60 °C		—	—	500	nA
Diode capacitance, f = 1 MHz	C_T				
V_R = 1 V		—	9	—	pF
28 V		—	1	—	pF
Capacitance ratio V_R = 1 V, 28 V; f = 1 MHz	$\frac{C_T1}{C_T28}$	—	9	—	—
Series resistance C_T = 9 pF, f = 100 MHz	r_s	—	1	—	Ω
Case capacitance f = 1 MHz	C_C	—	0,1	—	pF

Diode capacitance $C_T = f(V_R)$
f = 1 MHz



- For FM tuners
- Monolithic chip with common cathode for perfect tracking of both diodes
- Uniform "square law" characteristics
- Ideal Hifi tuning device when used in low-distortion, back-to-back configuration
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BB 804	
Ordering code	bulk: Q62702-B328	taped: Q62702-B356
Marking	SF (see next page for marking of capacitance subgroups)	

Maximum ratings per diode

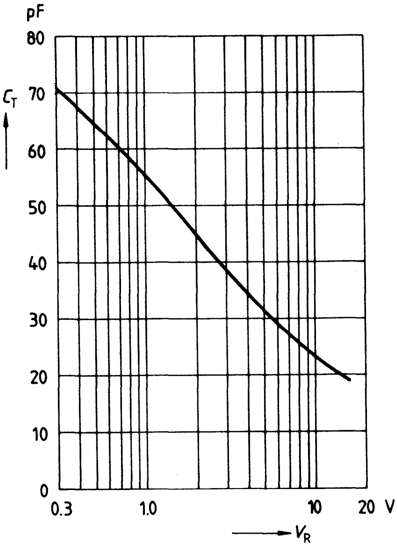
Reverse voltage	V_R	18	V
Peak reverse voltage	V_{RM}	20	V
Forward current $T_A \leq 60\,°C$	I_F	50	mA
Operating temperature	T_{op}	100	°C
Storage temperature range	T_{stg}	−65... +150	°C

Characteristics per diode (T_A = 25 °C)

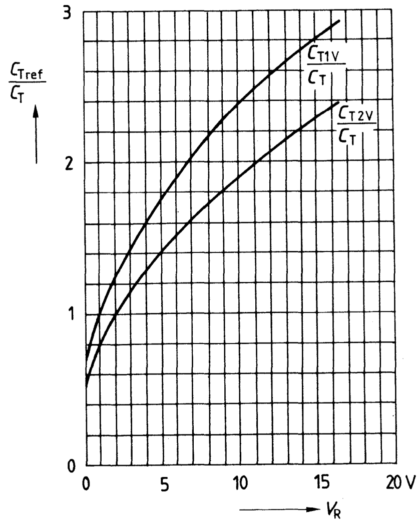
		min	typ	max	
Reverse current	I_R				
V_R = 16 V		—	—	20	nA
16 V, T_A = 60 °C		—	—	200	nA
Diode capacitance V_R = 2 V, f = 1 MHz	C_T	42	—	47,5	pF
Capacitance ratio V_R = 2 V, 8 V; f = 1 MHz	$\frac{C_T2}{C_T8}$	1,65	1,7	—	—
Series resistance C_T = 38 pF, f = 100 MHz	r_s	—	0,25	—	Ω
Q factor C_T = 38 pF, f = 100 MHz	Q	—	170	—	—
Temperature coefficient of diode capacitance V_R = 2 V, f = 1 MHz	TC_C	—	330	—	ppm/K
Capacitance subgroups[1)] V_R = 2 V, f = 1 MHz	C_T				
Subgroups: 0		42	—	43,5	pF
1		43	—	44,5	pF
2		44	—	45,5	pF
3		45	—	46,5	pF
4		46	—	47,5	pF

[1)] The capacitance subgroup is marked by the subgroup number printed on the component and the package label. A packaging unit (e.g. 8-mm tape) contains diodes of one subgroup only. Delivery of **discrete** capacitance subgroups requires a special agreement.

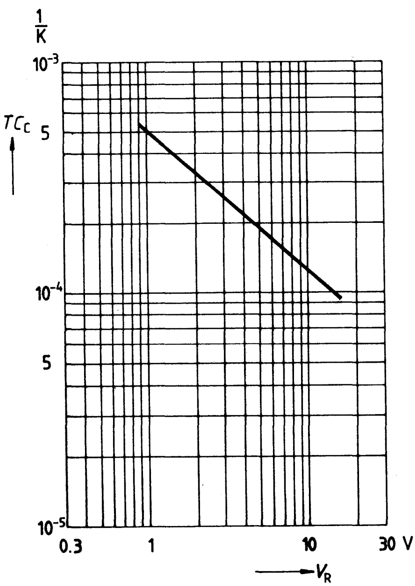
Diode capacitance $C_T = f(V_R)$
per diode, f = 1 MHz



Capacitance ratio $\frac{C_{Tref}}{C_T} = f(V_R)$
per diode; V_{ref} = 1 V, 2 V; f = 1 MHz



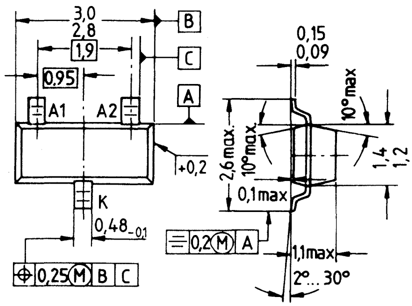
Temperature coefficient $TC_C = f(V_R)$
per diode, f = 1 MHz



Preliminary data

SOT 23

- High capacitance ratio for FM tuners with extended frequency band
- Monolithic chip (common cathode) for perfect tracking of both diodes
- Capacitance subgroups available upon request
- Miniature plastic package for surface mounting (SMD)



Dimensions in mm

Type	BB 814
Ordering code	Q62702-B404
Marking	SH

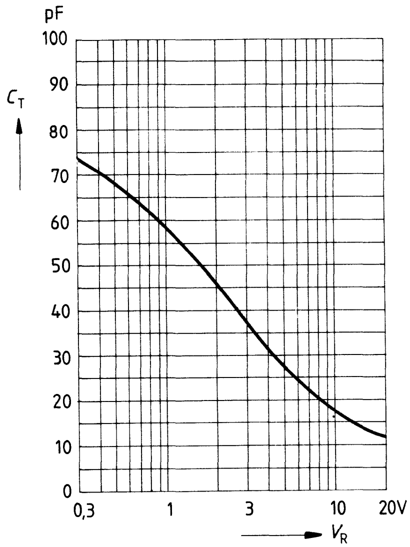
Maximum ratings per diode

Reverse voltage	V_R	18	V
Peak reverse voltage	V_{RM}	20	V
Forward current $T_A \leq 60\,°C$	I_F	50	mA
Storage temperature range	T_{stg}	−55... +100	°C

Characteristics per diode (T_A = 25 °C)

		min	typ	max	
Reverse current	I_R				
V_R = 16 V		—	—	20	nA
16 V, T_A = 60 °C		—	—	0,2	µA
Diode capacitance, f = 1 MHz	C_T				
V_R = 2 V		—	44,75	—	pF
8 V		—	20,3	—	pF
Capacitance ratio V_R = 2 V, 8 V; f = 1 MHz	$\frac{C_T2}{C_T8}$	—	2,2	—	—

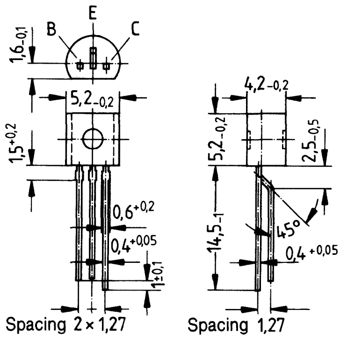
Diode capacitance $C_T = f(V_R)$
per diode, f = 1 MHz



Transistors

- For common emitter IF TV amplifier stages
- Low feedback capacitance due to shield diffusion

TO 92



Dimensions in mm

Type	BF 199
Ordering code	Q62702-F355

Maximum ratings

Collector-emitter voltage	V_{CEO}	25	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	2	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	500	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	$-55...+150$	°C

Thermal resistance

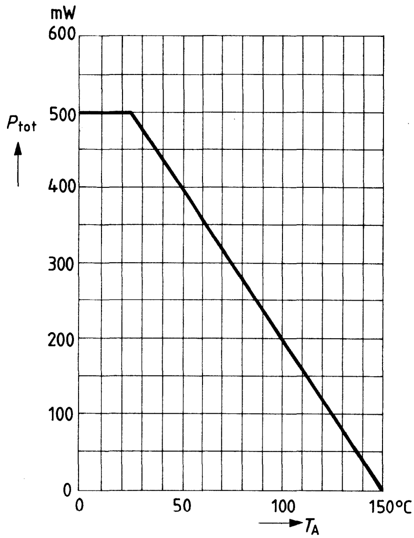
Junction — ambient	R_{thJA}	≤ 250	K/W

Characteristics (T_A = 25 °C)

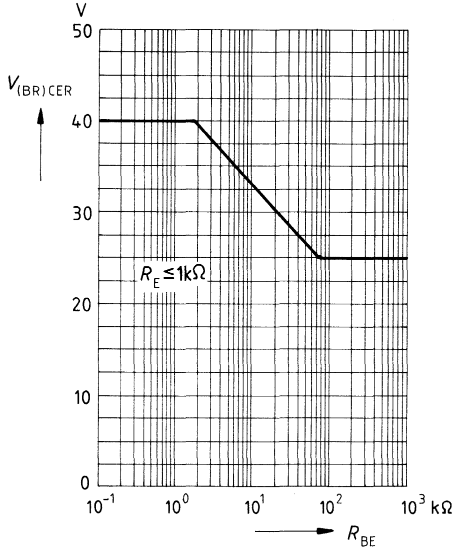
DC characteristics		**min**	**typ**	**max**	
Collector cutoff current V_{CB} = 40 V	I_{CBO}	—	—	100	nA
DC current gain I_C = 7 mA, V_{CE} = 10 V	h_{FE}	38	85	—	—
Base-emitter voltage I_C = 7 mA, V_{CE} = 10 V	V_{BE}	—	780	—	mV

AC characteristics					
Transition frequency I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	550	—	MHz
Collector-base capacitance V_{CE} = 10 V, V_{BE} = 0, f = 1 MHz	c_{cb}	—	0,32	—	pF
Optimum power gain I_C = 7 mA, V_{CE} = 10 V, f = 35 MHz	$G_{pe\ opt}$	—	43	—	dB
Y parameters, common emitter I_C = 7 mA, V_{CE} = 10 V, f = 35 MHz					
	g_{11e}	—	4,8	—	mS
	c_{11e}	—	45	—	pF
	$\|y_{12e}\|$	—	70	—	µS
	φ_{12e}	—	−95	—	deg
	$\|y_{21e}\|$	—	175	—	mS
	φ_{21e}	—	−25	—	deg
	g_{22e}	—	80	—	µS
	c_{22e}	—	1,7	—	pF

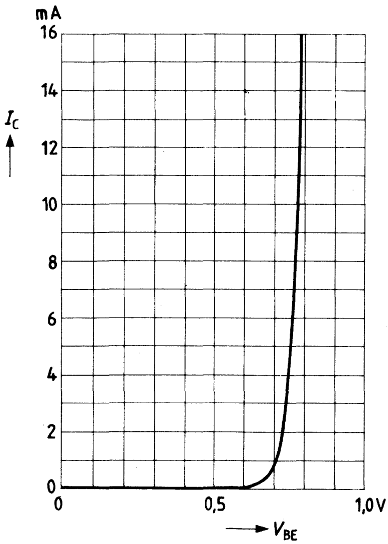
Total power dissipation $P_{tot} = f(T_A)$



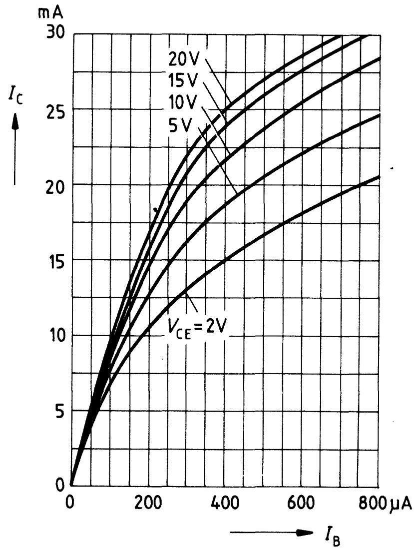
Collector-emitter breakdown voltage
$V_{(BR)CER} = f(R_{BE})$



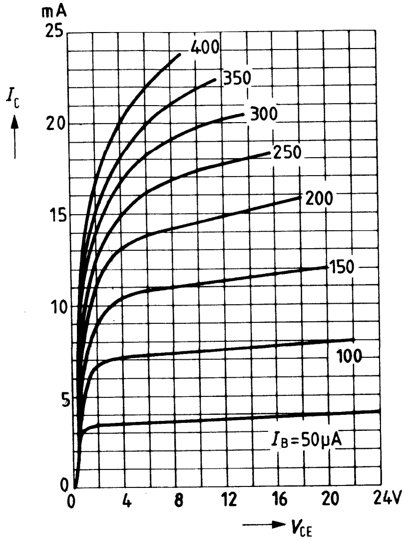
Collector current $I_C = f(V_{BE})$



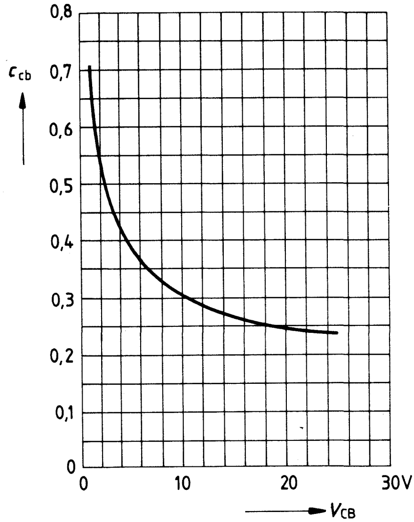
Collector current $I_C = f(I_B)$



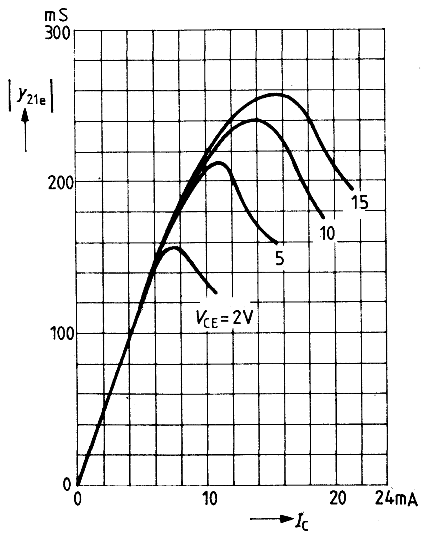
Output characteristics $I_C = f(V_{CE})$



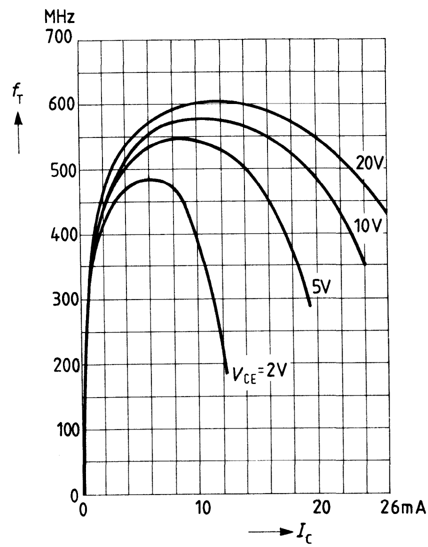
Collector-base capacitance $C_{cb} = f(V_{CB})$
f = 1 MHz



Forward transfer admittance $y_{21e} = f(I_C)$
f = 35 MHz



Transition frequency $f_T = f(I_C)$
f = 100 MHz

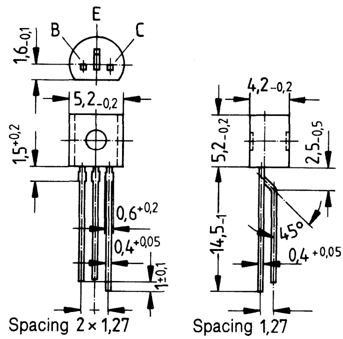


NPN Silicon RF Transistors

BF 240
BF 241

- For AM and FM stages
- Low feedback capacitance due to shield diffusion
- Low output conductance

TO 92



Dimensions in mm

Type	BF 240	BF 241
Ordering code	Q62702-F302	Q62702-F303

Maximum ratings

Collector-emitter voltage	V_{CEO}	40	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	2	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 ... +150	°C

Thermal resistance

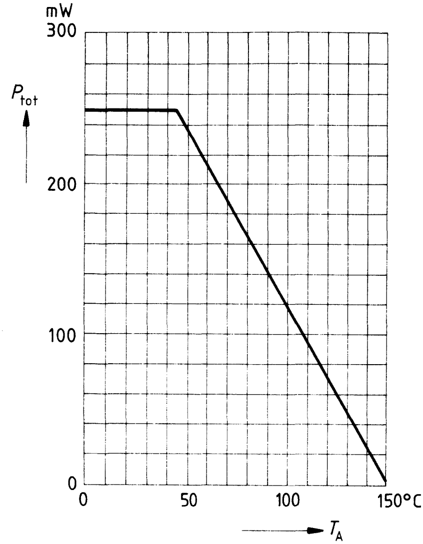
Junction — ambient	R_{thJA}	≤420	K/W

Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)CBO}$	40	–	–	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)EBO}$	4	–	–	V
Collector cutoff current V_{CB} = 20 V	I_{CBO}	–	–	100	nA
Base-emitter voltage I_C = 1 mA, V_{CE} = 10 V	V_{BE}	–	700	–	mV
DC current gain I_C = 1 mA, V_{CE} = 10 V	h_{FE}				
BF 240		65	–	220	–
BF 241		35	–	125	–

AC characteristics					
Transition frequency I_C = 1 mA, V_{CE} = 10 V	f_T	–	400	–	MHz
Collector-base capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	–	0,3	–	pF
Noise figure I_C = 1 mA, V_{CE} = 10 V, f = 100 kHz R_S = 300 Ω	F	–	1,7	–	dB
Output conductance I_C = 1 mA, V_{CE} = 10 V, f = 10,7 MHz	g_{22e}	–	–	10,5	µS
0,5 MHz		–	–	8,3	µS

Total power dissipation $P_{tot} = f(T_A)$

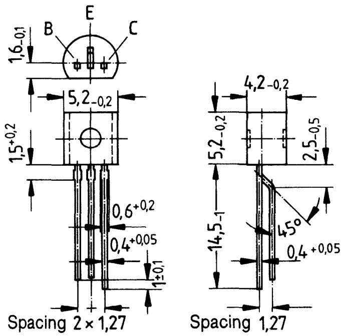


NPN Silicon RF Transistors

BF 254
BF 255

- For AM and FM stages

TO 92



Dimensions in mm

Type	BF 254	BF 255
Ordering code	Q62702-F201	Q62702-F202

Maximum ratings

Collector-emitter voltage	V_{CEO}	20	V
Collector-base voltage	V_{CES}	30	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	30	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤420	K/W

Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
DC current gain I_C = 1 mA, V_{CE} = 10 V	h_{FE}				
BF 254		65	—	220	—
BF 255		35	—	130	—
Base-emitter voltage I_C = 1 mA, V_{CE} = 10 V	V_{BE}	—	0,68	—	V

AC characteristics					
Transition frequency I_C = 1 mA, V_{CE} = 10 V, f = 100 MHz	f_T				
BF 254		—	260	—	MHz
BF 255		—	220	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	—	0,6	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	—	0,6	—	pF
Noise figure I_C = 1 mA, V_{CE} = 10 V	F				
f = 1 MHz, g_S = 1,5 mS[1]		—	1,2	—	dB
100 MHz, 10 mS[1]		—	3,8	—	dB

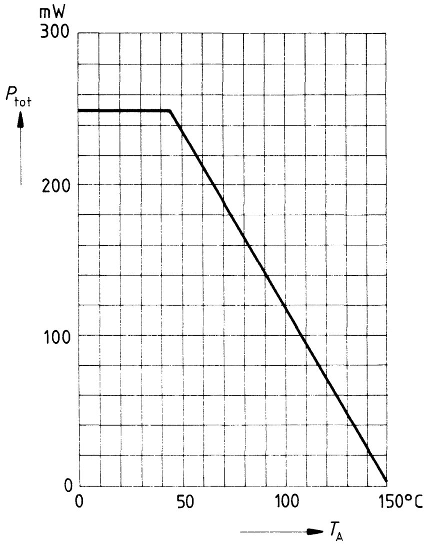
[1] g_S = Generator conductance

AC characteristics (continued)

Y parameters, typical values, $I_C = 10$ V

f MHz		g_{11} mS	b_{11} mS	$\|y_{12}\|$ µS	φ_{12} deg.	$\|y_{21}\|$ mS	φ_{21} deg.	g_{22} µS	b_{22} µS
Common emitter									
0,45	BF 254	0,3	0,06	1,7	−90	38	0	3,2	3,4
	BF 255	0,45	0,08	1,7	−90	38	0	2,7	3,4
10,7	BF 254	0,4	1,5	41	−90	37	−10	4	8,1
	BF 255	0,5	1,75	41	−90	37	−10	3,8	8,1
Common base									
100	BF 255	34	−3,5	250	−85	33	150	18	700

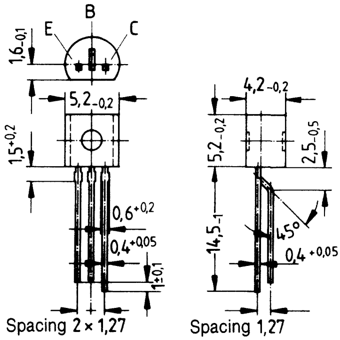
Total power dissipation $P_{tot} = f(T_A)$



NPN Silicon RF Transistor — BF 414

- For low-noise, common base VHF and FM stages

TO 92



Dimensions in mm

Type	BF 414
Ordering code	Q62702-F517

Maximum ratings

Collector-emitter voltage	V_{CEO}	30	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	3	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤350	K/W

Characteristics (T_A = 25 °C)

DC characteristics		min	typ	max	
Collector-emitter breakdown voltage I_C = 2 mA, I_B = 0	$V_{(BR)CEO}$	30	–	–	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	40	–	–	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)EBO}$	4	–	–	V
Collector cutoff current V_{CB} = 20 V	I_{CBO}	–	–	60	nA
DC current gain I_C = 4 mA, V_{CE} = 10 V	h_{FE}	30	80	–	–

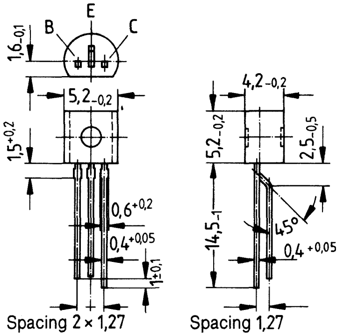
AC characteristics					
Transition frequency	f_T				
I_C = 1 mA, V_{CE} = 10 V, f = 100 MHz		–	400	–	MHz
5 mA, 10 V, 100 MHz		–	560	–	MHz
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	–	0,1	–	pF
Noise figure I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz R_S = 60 Ω	F	–	3	–	dB

PNP Silicon RF Transistors

BF 450
BF 451

- For common emitter AM and FM stages
- Low feedback capacitance due to shield diffusion

TO 92



Dimensions in mm

Type	BF 450	BF 451
Ordering code	Q62702-F312	Q62702-F313

Maximum ratings

Collector-emitter voltage	V_{CEO}	40	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	$-55...+150$	°C

Thermal resistance

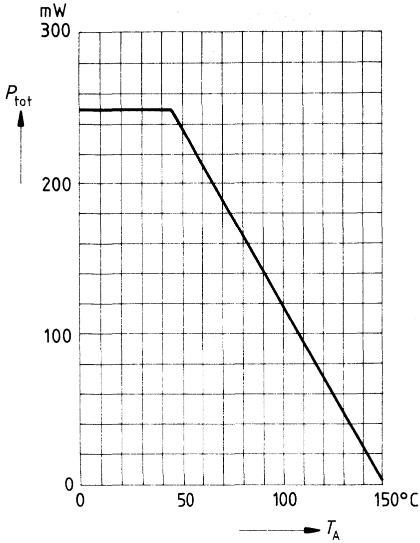
Junction — ambient	R_{thJA}	≤ 420	K/W

Characteristics (T_A = 25 °C)

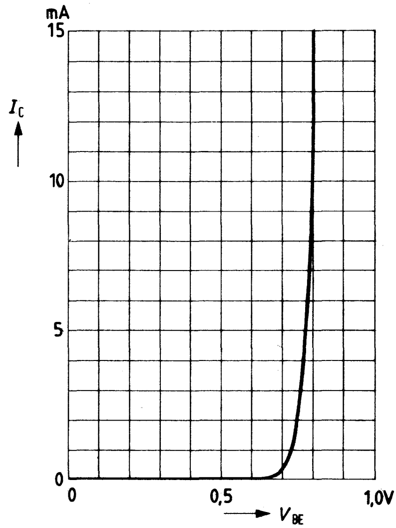
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 2mA	$V_{(BR)\,CEO}$	40	—	—	V
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)\,CBO}$	40	—	—	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)\,EBO}$	4	—	—	V
Collector cutoff current V_{CB} = 30 V	I_{CBO}	—	—	50	nA
DC current gain I_C = 1 mA, V_{CE} = 10 V	h_{FE}				
BF 450		65	—	220	—
BF 451		35	—	125	—
Base-emitter voltage I_C = 1 mA, V_{CE} = 10 V	V_{BE}	—	0,72	—	V

AC characteristics					
Transition frequency I_C = 1 mA, V_{CE} = 10 V, f = 100 MHz	f_r				
BF 450		—	375	—	MHz
BF 451		—	325	—	MHz
Collector-base capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	—	0,32	—	pF
Noise figure, V_{CE} = 10 V	F				
I_C = 1 mA, f = 100 kHz, R_S = 300 Ω		—	2	—	dB
2 mA, 100 MHz, 60 Ω		—	3	—	dB
Y parameters, common emitter I_C = 1 mA, V_{CE} = 10 V f = 0,45…10 MHz	g_{11e}				
BF 450		—	0,5	—	mS
BF 451		—	0,8	—	mS
	c_{11e}				
BF 450		—	17	—	pF
BF 451		—	19	—	pF
	$\|y_{21e}\|$	—	35	—	mS
	c_{22e}	—	1,4	—	pF
f = 500 kHz	g_{22e}	—	—	8	µS
10 MHz	g_{22e}	—	—	10	µS

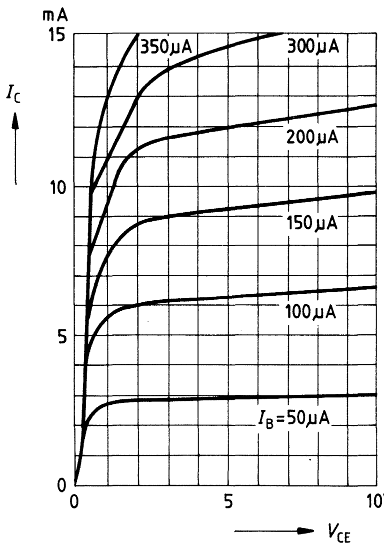
Total power dissipation $P_{tot} = f(T_A)$



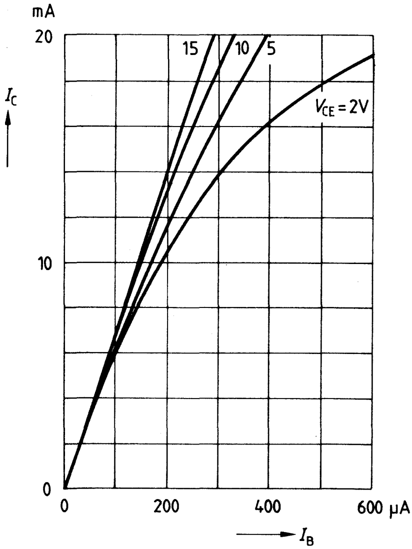
Input characteristics $I_C = f(V_{BE})$
$V_{CE} = 10$ V



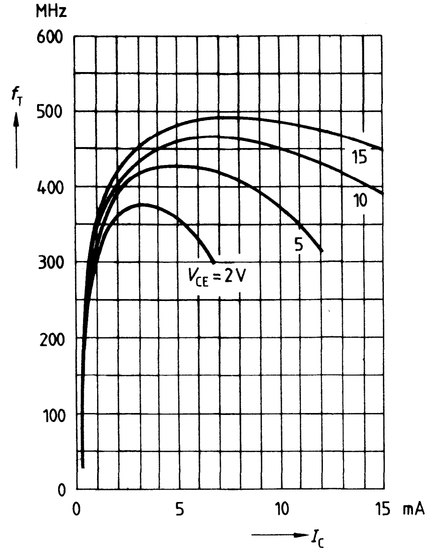
Output characteristics $I_C = f(V_{CE})$



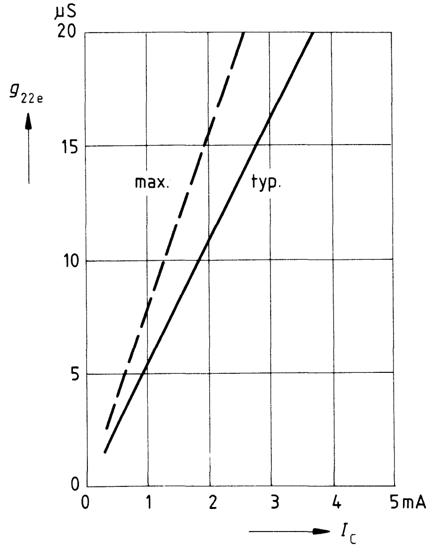
Collector current $I_C = f(I_B)$



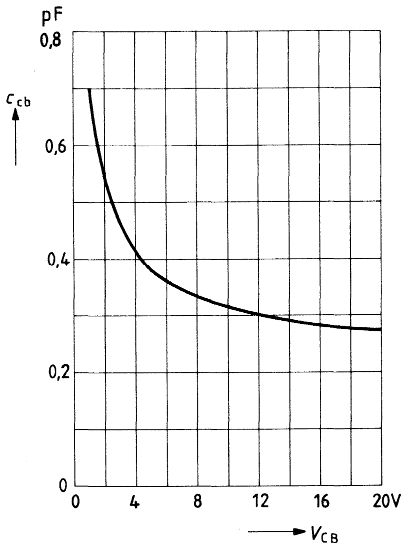
Transition frequency $f_T = f(I_C)$
$f = 100$ MHz



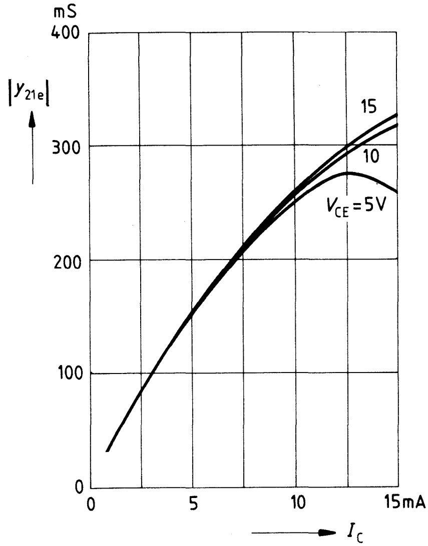
Output conductance $g_{22e} = f(I_C)$
$V_{CE} = 10$ V, $f = 500$ kHz



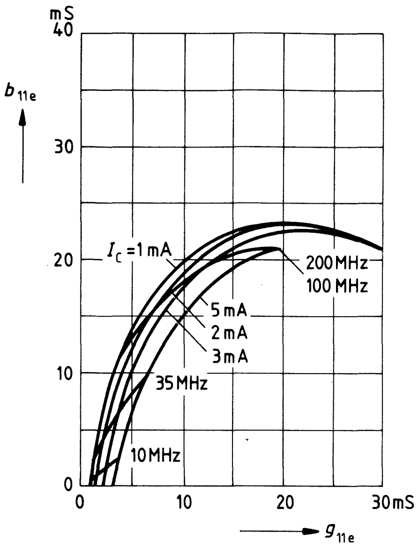
Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



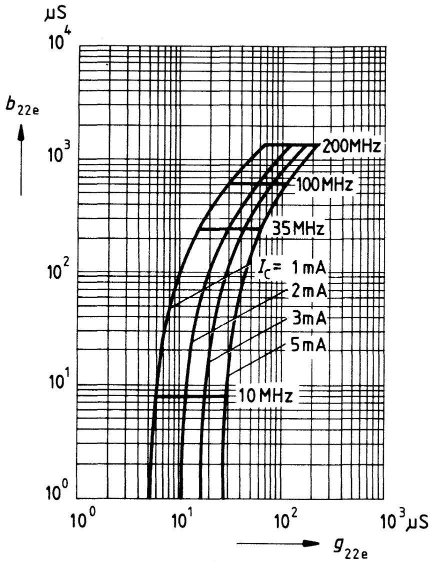
Forward transfer admittance $|y_{21e}| = f(I_C)$
$f = 10{,}7$ MHz



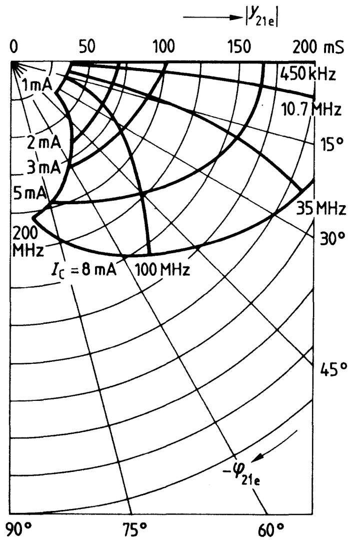
Input admittance y_{11e}
V_{CE} = 10 V



Output admittance y_{22e}
V_{CE} = 10 V

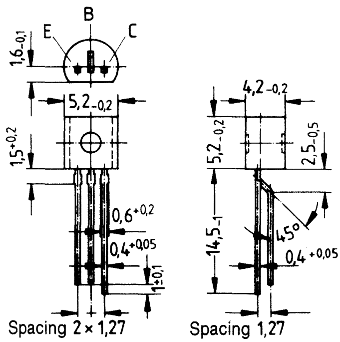


Forward transfer admittance y_{21e}
V_{CE} = 10 V



- For VHF mixer and oscillator stages

TO 92



Dimensions in mm

Type	BF 506
Ordering code	Q62702-F534

Maximum ratings

Collector-emitter voltage	V_{CEO}	35	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	30	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–55... + 150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤350	K/W

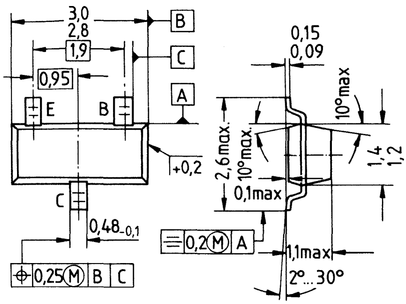
Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 2 mA	$V_{(BR)\,CEO}$	35	—	—	V
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)\,CBO}$	40	—	—	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)\,EBO}$	4	—	—	V
Collector cutoff current V_{CB} = 20 V	I_{CBO}	—	—	100	nA
DC current gain I_C = 3 mA, V_{CE} = 10 V	h_{FE}	25	—	—	—

AC characteristics					
Transition frequency I_C = 2 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	550	—	MHz
Collector-emitter capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{ce}	—	0,12	—	V
Noise figure I_C = 2 mA, V_{CB} = 10 V, f = 200 MHz R_S = 60 Ω	F	—	3	—	dB

- For broadband amplifier and oscillator applications up to 1 GHz
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 517	
Ordering code	bulk: Q62702-F988	taped: Q62702-F78
Marking	LR	

Maximum ratings

Collector-emitter voltage	V_{CEO}	15	V
Collector-base voltage	V_{CBO}	20	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	25	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65... +150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

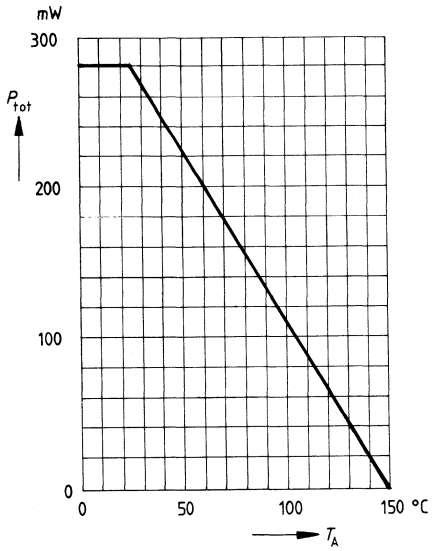
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics ($T_A = 25\,°C$)

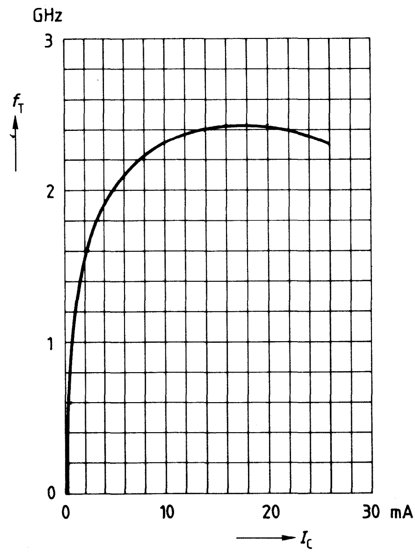
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage $I_C = 1$ mA, $I_B = 0$	$V_{(BR)\,CEO}$	15	—	—	V
Collector cutoff current $V_{CB} = 15$ V, $I_E = 0$	I_{CBO}	—	—	50	nA
DC current gain $I_C = 5$ mA, $V_{CE} = 10$ V	h_{FE}	25	—	250	—
Collector-emitter saturation voltage $I_C = 10$ mA, $I_B = 1$ mA	$V_{CE\,sat}$	—	0,1	0,5	V
Base-emitter saturation voltage $I_C = 10$ mA, $I_B = 1$ mA	V_{BEsat}	—	—	0,95	V

AC characteristics					
Transition frequency $I_C = 5$ mA, $V_{CE} = 10$ V, $f = 200$ MHz	f_T	1	2	—	GHz
Collector-base capacitance $V_{CB} = 10$ V, $V_{BE} = 0$ V, $f = 1$ MHz	c_{cb}	0,3	0,5	0,75	pF
Collector-emitter capacitance $V_{CE} = 10$ V, $V_{BE} = 0$ V, $f = 1$ MHz	c_{ce}	—	0,26	0,4	pF
Noise figure $I_C = 5$ mA, $V_{CE} = 10$ V, $f = 100$ MHz 800 MHz	F	 — —	 2,5 5	 — —	 dB dB

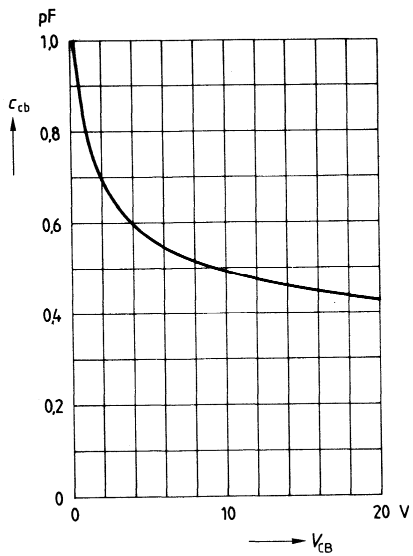
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
V_{CE} = 10 V, f = 200 MHz

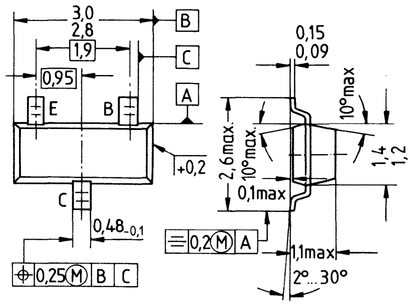


Collector-base capacitance $c_{cb} = f(V_{CB})$
f = 1 MHz



- For common emitter amplifier stages up to 300 MHz
- For mixer applications in AM/FM radios and VHF TV tuners
- Low feedback capacitance due to shield diffusion
- Controlled low output conductance
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 550	
Ordering code	bulk: Q62702-F547	taped: Q62702-F944
Marking	LA	

Maximum ratings

Collector-emitter voltage	V_{CEO}	40	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65...+150	°C
Thermal resistance			
Junction — ambient	R_{thJA}	≤450	K/W[1]

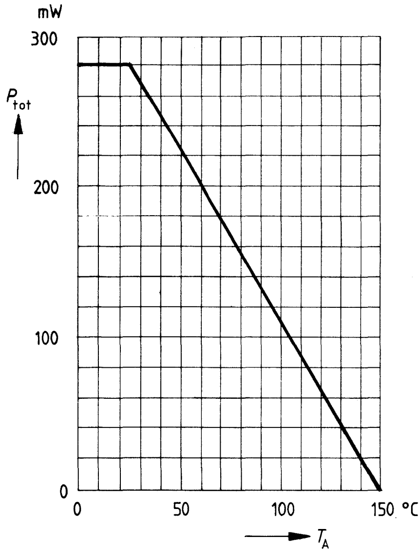
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

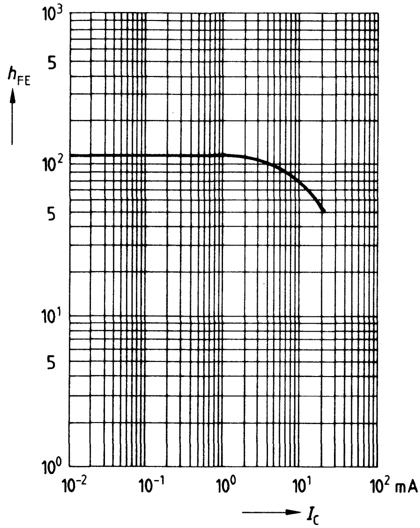
DC characteristics		min	typ	max	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	40	—	—	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)\,CBO}$	40	—	—	V
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)\,EBO}$	4	—	—	V
Collector cutoff current V_{CB} = 30 V, I_E = 0	I_{CBO}	—	—	100	nA
DC current gain I_C = 1 mA, V_{CE} = 10 V	h_{FE}	50	—	250	—
Base-emitter voltage I_C = 1 mA, V_{CE} = 10 V	V_{BE}	—	0,72	—	V

AC characteristics					
Transition frequency I_C = 1 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	350	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	—	0,33	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	—	0,67	—	pF
Noise figure V_{CE} = 10 V	F				
I_C = 1 mA, f = 100 kHz, R_S = 300 Ω		—	2	—	dB
2 mA, 100 MHz, 60 Ω		—	3,4	—	dB
Y parameters, common emitter I_C = 1 mA, V_{CE} = 10 V					
f = 0,45...10 MHz	g_{11e}	—	550	—	µS
	C_{11e}	—	17	—	pF
	$\|y_{21e}\|$	—	35	—	mS
	C_{22e}	—	1,3	—	pF
f = 500 kHz	g_{22e}	—	5	8	µS
10 MHz	g_{22e}	—	5	10	µS

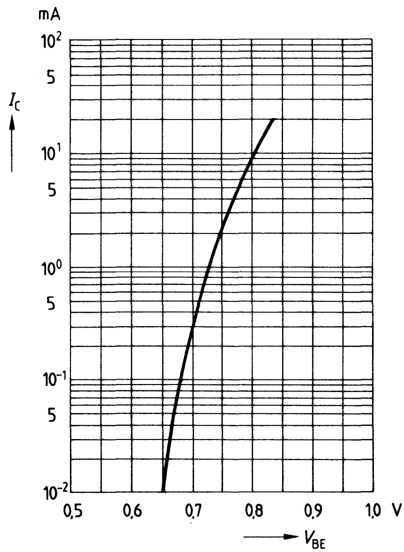
Total power dissipation $P_{tot} = f(T_A)$



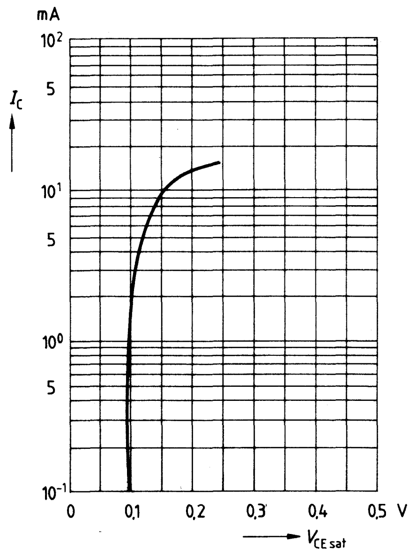
DC current gain $h_{FE} = f(I_C)$
V_{CE} = 10 V



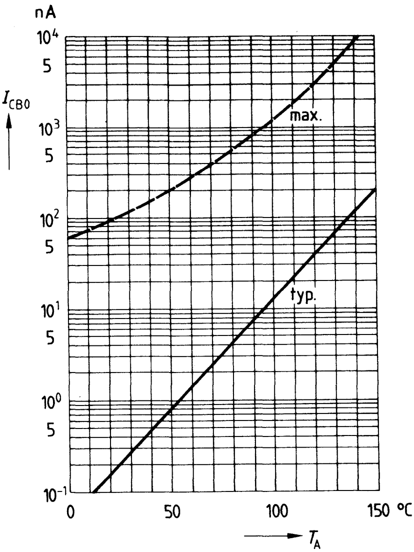
Collector current $I_C = f(V_{BE})$
V_{CE} = 10 V



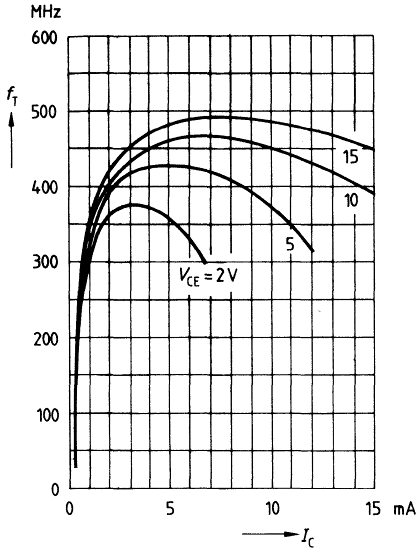
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
h_{FE} = 10



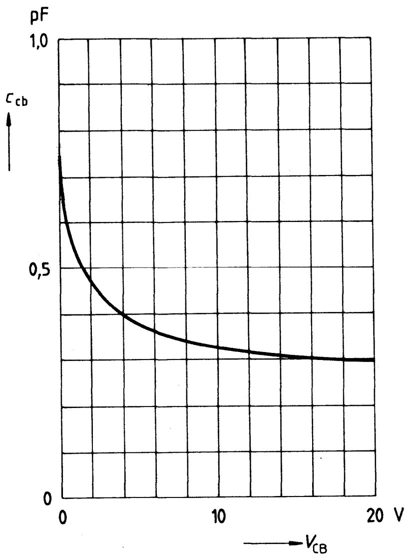
Collector cutoff current $I_{CBO} = f(T_A)$
$V_{CB} = 30$ V



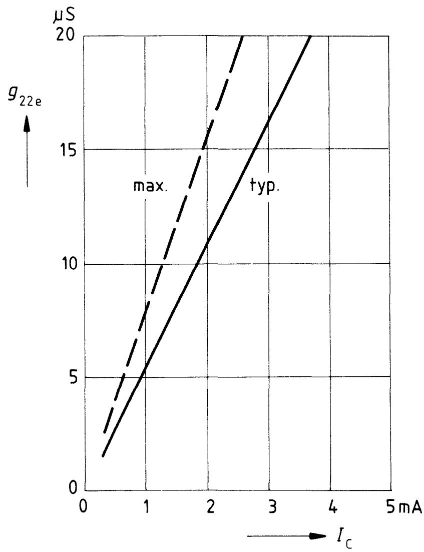
Transition frequency $f_T = f(I_C)$
$f = 100$ MHz



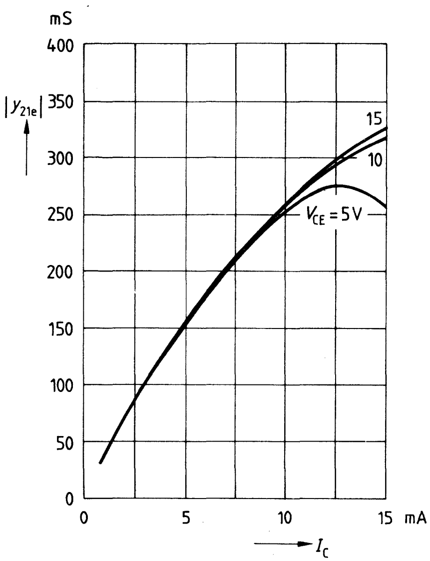
Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



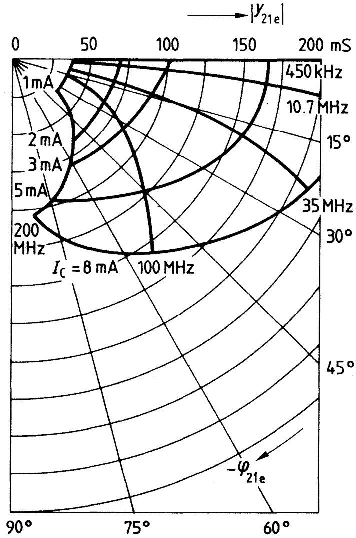
Output conductance $g_{22e} = f(I_C)$
$V_{CE} = 10$ V, $f = 500$ kHz



Forward transfer admittance $|y_{21e}| = f(I_C)$
f = 10,7 MHz



Forward transfer admittance y_{21e}
V_{CE} = 10 V

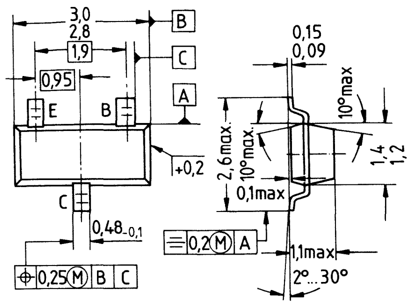


NPN Silicon RF Transistor

BF 554

- For general small-signal RF applications up to 300 MHz in amplifier, mixer and oscillator circuits
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 554	
Ordering code	bulk: Q62702-F551	taped: Q62702-F1042
Marking	CC	

Maximum ratings

Collector-emitter voltage	V_{CEO}	20	V
Collector-base voltage	V_{CBO}	30	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	I_C	30	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–65...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

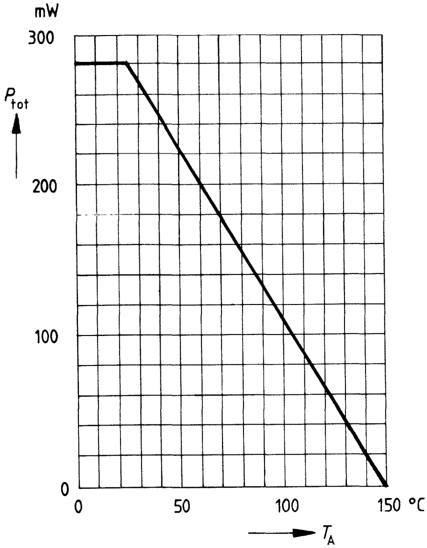
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics ($T_A = 25\,°C$)

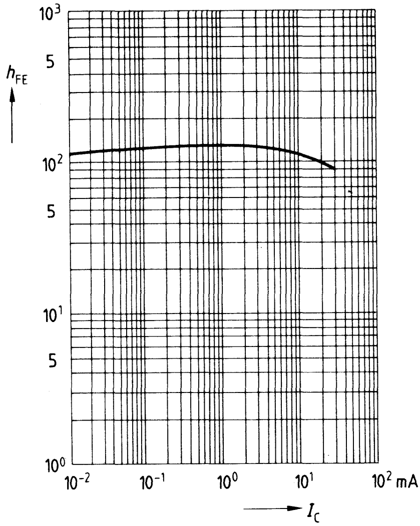
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage $I_C = 1$ mA, $I_B = 0$	$V_{(BR)\,CEO}$	20	—	—	V
Collector cutoff current $V_{CB} = 20$ V, $I_E = 0$	I_{CBO}	—	—	100	nA
DC current gain $I_C = 1$ mA, $V_{CE} = 10$ V	h_{FE}	60	—	250	—
Base-emitter voltage $I_C = 1$ mA, $V_{CE} = 10$ V	V_{BE}	—	0,7	—	V

AC characteristics					
Transition frequency $I_C = 1$ mA, $V_{CE} = 10$ V, $f = 100$ MHz	f_T	—	250	—	MHz
Collector-base capacitance $V_{CE} = 10$ V, $V_{BE} = 0$ V, $f = 1$ MHz	c_{cb}	—	0,6	—	pF
Noise figure $I_C = 1$ mA, $V_{CE} = 10$ V	F				
$f = 200$ kHz, $g_S = 2$ mS		—	1,5	—	dB
1 MHz, 1,5 mS		—	1,2	—	dB
100 MHz, 10 mS		—	3	—	dB
Output conductance $I_C = 1$ mA, $V_{CE} = 10$ V, $f = 0{,}5\ldots10$ MHz	g_{22e}	—	4	—	µS

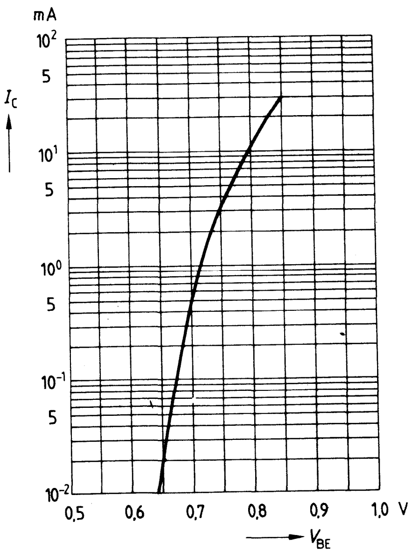
Total power dissipation $P_{tot} = f(T_A)$



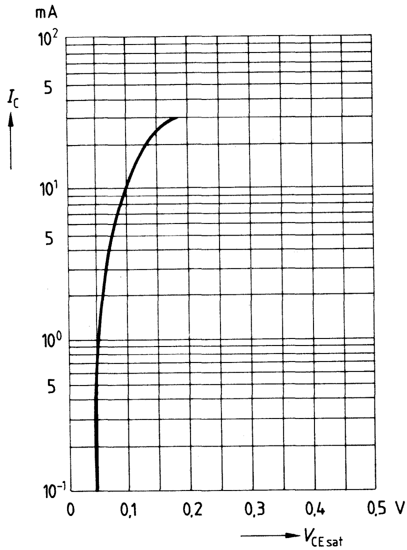
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 10$ V



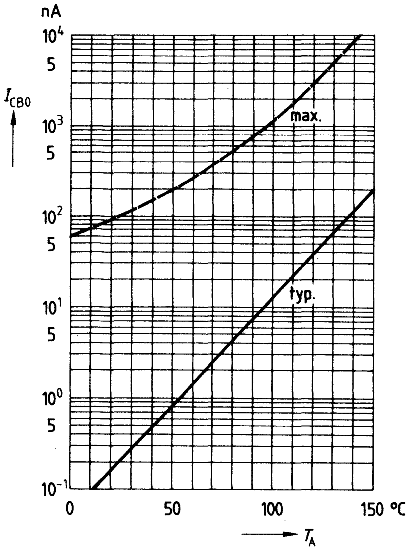
Collector current $I_C = f(V_{BE})$
$V_{CE} = 10$ V



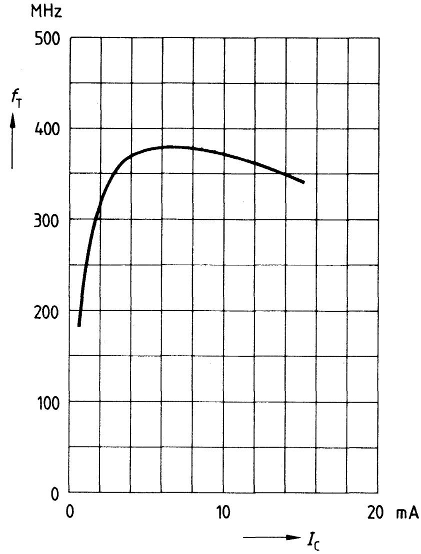
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
$h_{FE} = 10$



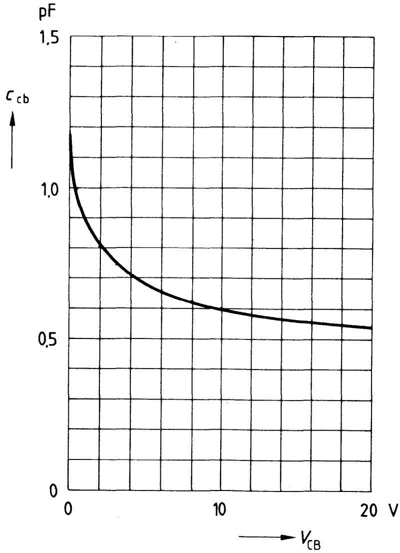
Collector cutoff current $I_{CBO} = f(T_A)$
$V_{CB} = 20$ V



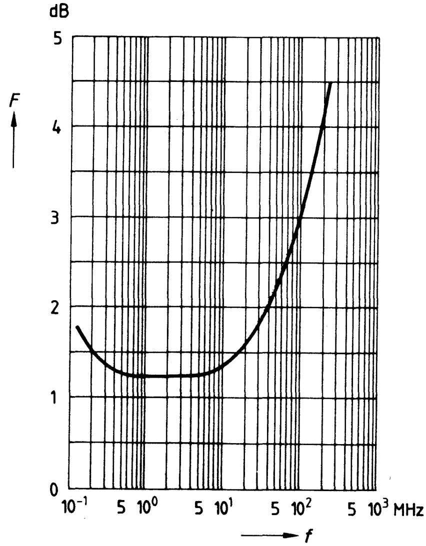
Transition frequency $f_T = f(I_C)$
$V_{CE} = 10$ V, $f = 100$ MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz

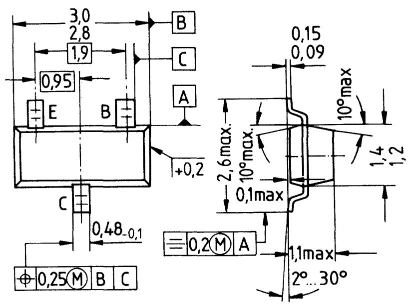


Noise figure $F = f(f)$
$I_C = 1$ mA, $V_{CE} = 10$ V, $R_S = 60\ \Omega$



- For oscillators, mixers and self-oscillating mixer stages in UHF TV tuners
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 569	
Ordering code	bulk: Q62702-F548	taped: Q62702-F869
Marking	LH	

Maximum ratings

Collector-emitter voltage	V_{CEO}	35	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	30	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	– 55... + 150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

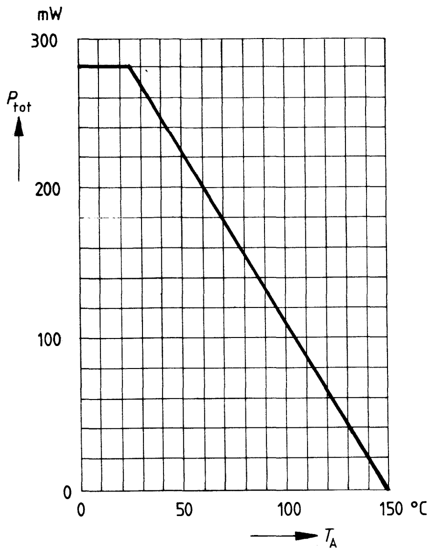
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

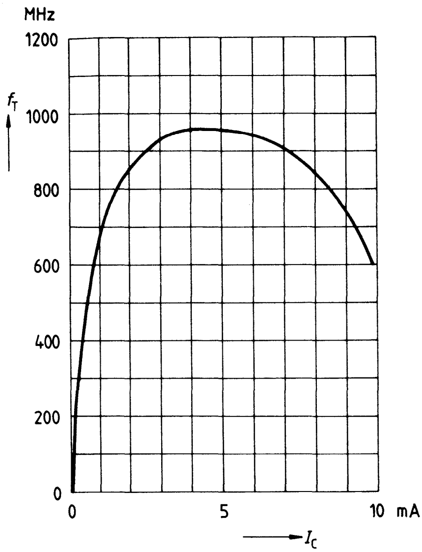
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	35	—	—	V
Collector cutoff current V_{CB} = 20 V, I_E = 0	I_{CBO}	—	—	100	nA
DC current gain I_C = 3 mA, V_{CE} = 10 V	h_{FE}	20	50	—	—

AC characteristics					
Transition frequency I_C = 3 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	950	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	—	0,32	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	—	0,15	—	pF
Noise figure I_C = 3 mA, V_{CB} = 10 V, f = 800 MHz R_S = 60 Ω	F	—	4,5	—	dB
Common base power gain I_C = 3 mA, V_{CB} = 10 V, f = 800 MHz R_L = 500 Ω	G_P	—	14,8	—	dB

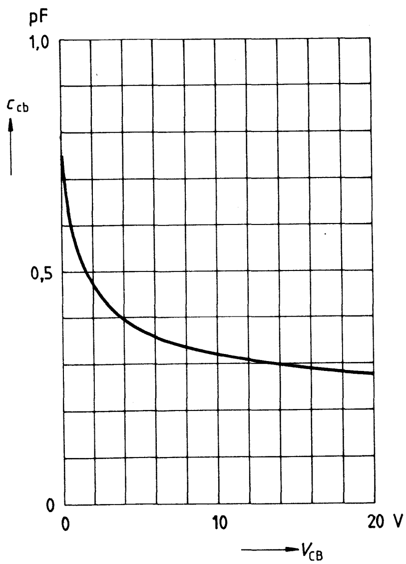
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
V_{CE} = 10 V, f = 100 MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
f = 1 MHz

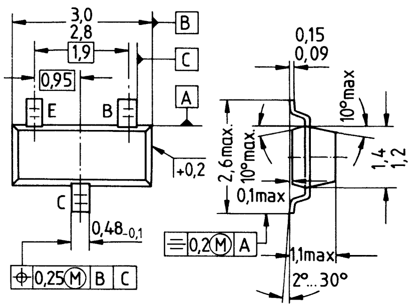


PNP Silicon RF Transistor

BF 579

- For low-distortion, low-noise VHF/UHF amplifier and UHF oscillator applications in TV tuners
- Typical collector current 10 mA
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 579	
Ordering code	bulk: Q62702-F552	taped: Q62702-F971
Marking	LJ	

Maximum ratings

Collector-emitter voltage	V_{CEO}	20	V
Collector-base voltage	V_{CBO}	25	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	30	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–55...+150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤450	K/W[1]

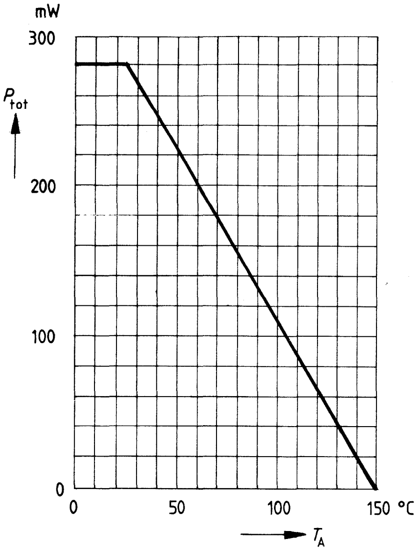
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

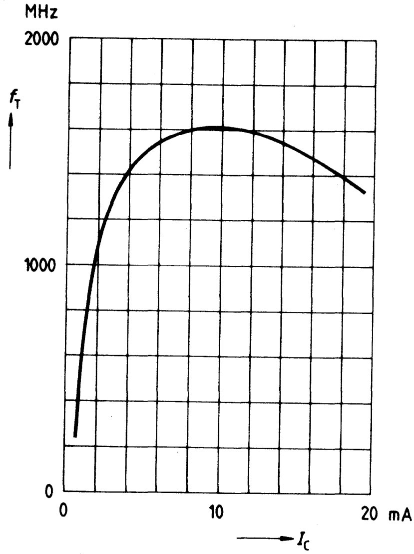
DC characteristics		min	typ	max	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	20	—	—	V
Collector cutoff current V_{CB} = 20 V, I_E = 0	I_{CBO}	—	—	100	nA
DC current gain I_C = 10 mA, V_{CE} = 10 V	h_{FE}	20	—	—	—

AC characteristics					
Transition frequency I_C = 10 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	1,6	—	GHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	—	0,41	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	—	0,16	—	pF
Noise figure I_C = 10 mA, V_{CB} = 10 V, R_S = 60 Ω	F				
f = 800 MHz		—	4	—	dB
200 MHz		—	2,9	—	dB
Common base power gain I_C = 10 mA, V_{CB} = 10 V, f = 800 MHz R_L = 500 Ω	G_P	—	16	—	dB

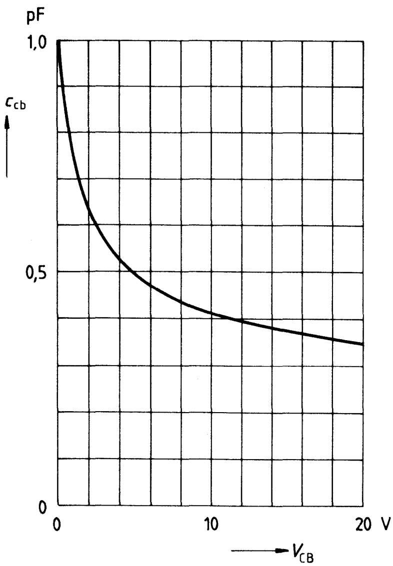
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
$V_{CE} = 10$ V, $f = 100$ MHz



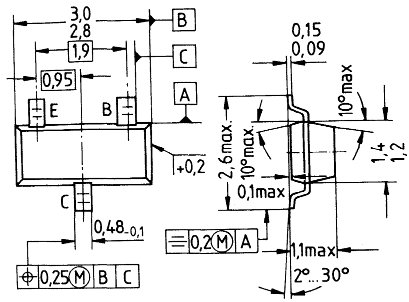
Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



NPN Silicon RF Transistor

- Common emitter IF/RF amplifier
- Low feedback capacitance due to shield diffusion
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 599	
Ordering code	bulk: Q62702-F550	taped: Q62702-F979
Marking	NB	

Maximum ratings

Collector-emitter voltage	V_{CEO}	25	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

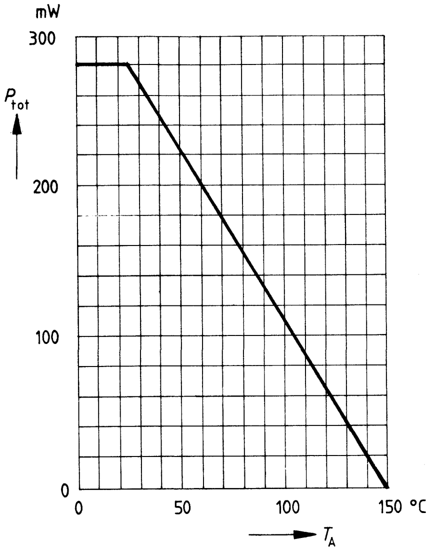
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

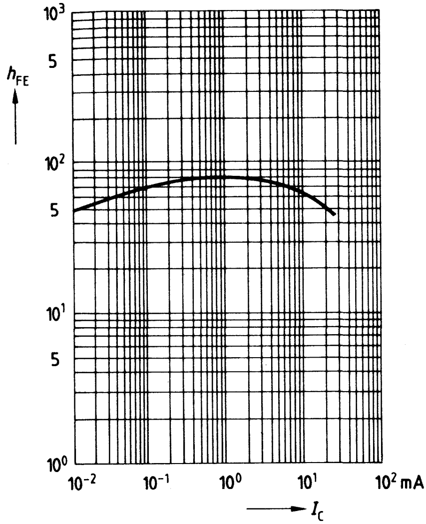
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	25	—	—	V
Collector cutoff current V_{CB} = 20 V, I_E = 0	I_{CBO}	—	—	100	nA
DC current gain I_C = 7 mA, V_{CE} = 10 V	h_{FE}	38	70	—	—
Collector-emitter saturation voltage I_C = 10 mA, I_B = 1 mA	$V_{CE\,sat}$	—	0,15	—	V
Base-emitter voltage I_C = 7 mA, V_{CE} = 10 V	V_{BE}	—	0,78	—	V

AC characteristics					
Transition frequency I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	550	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	—	0,35	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	—	0,68	—	pF
Optimum power gain I_C = 7 mA, V_{CE} = 10 V, f = 35 MHz	$G_{pe\,opt}$	—	43	—	dB
Forward transfer admittance I_C = 7 mA, V_{CE} = 10 V, f = 35 MHz	$\|y_{21e}\|$	—	175	—	mS

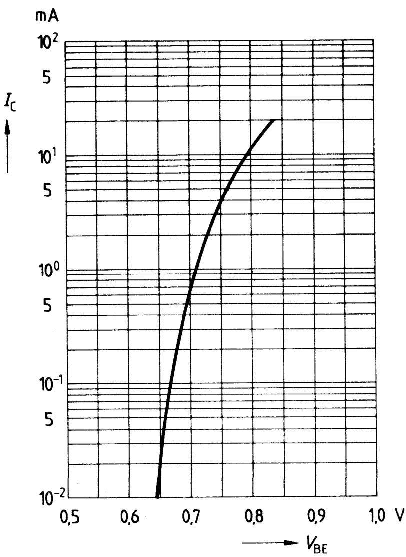
Total power dissipation $P_{tot} = f(T_A)$



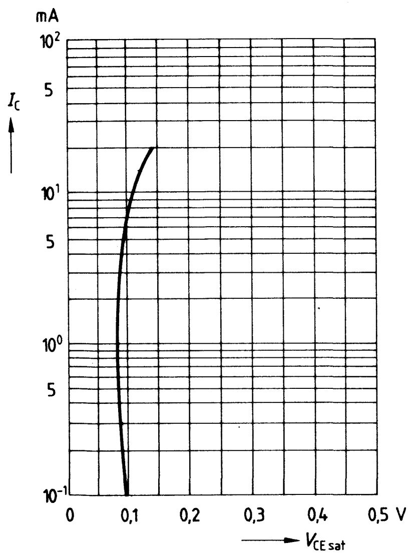
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 10$ V



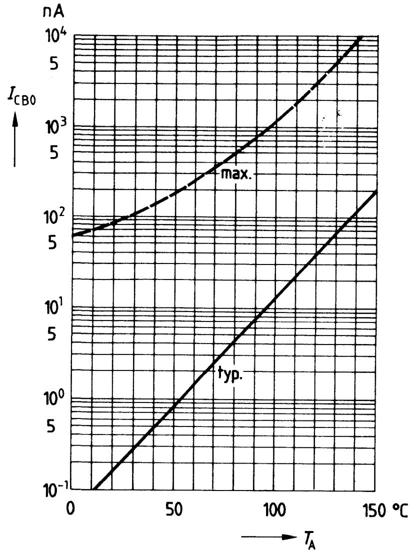
Collector current $I_C = f(V_{BE})$
$V_{CE} = 10$ V



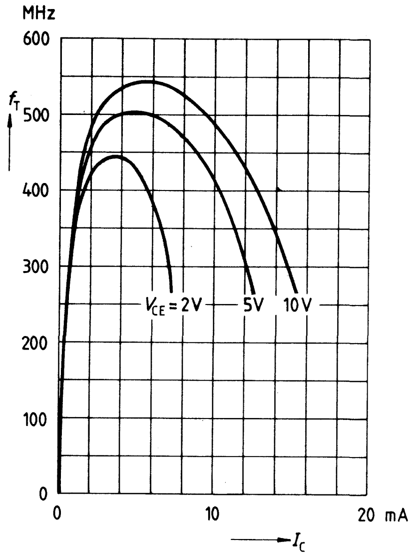
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
$h_{FE} = 10$



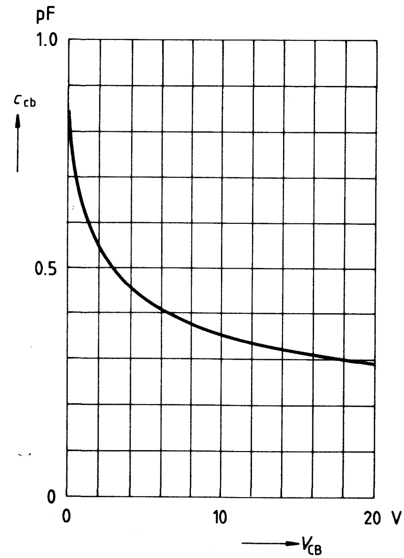
Collector cutoff current $I_{CBO} = f(T_A)$
$V_{CB} = 20$ V



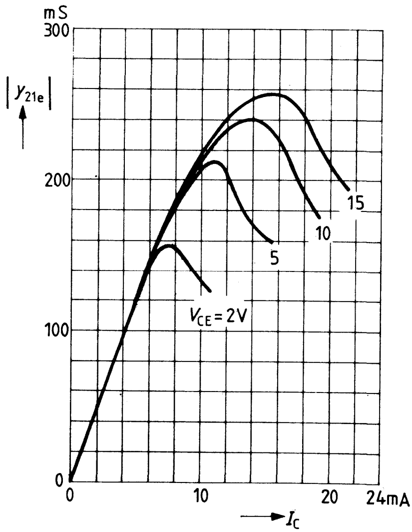
Transition frequency $f_T = f(I_C)$
$f = 100$ MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz

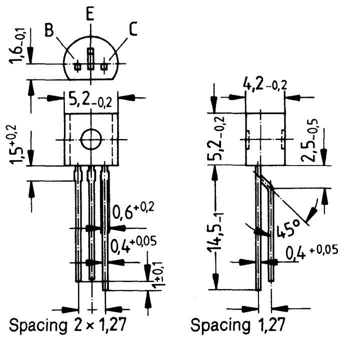


Forward transfer admittance $|y_{21e}| = f(I_C)$



- For VHF oscillator stages

TO 92



Type	BF 606 A
Ordering code	Q62702-F535

Maximum ratings

Collector-emitter voltage	V_{CEO}	30	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Emitter current	I_E	30	mA
Total power dissipation ($T_A \leq 45\,°C$)	P_{tot}	300	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤350	K/W

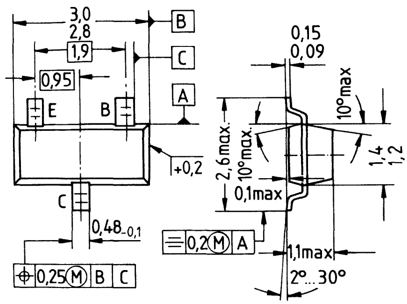
Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 2 mA	$V_{(BR)CEO}$	30	–	–	V
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)CBO}$	40	–	–	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)EBO}$	4	–	–	V
Collector cutoff current V_{CB} = 20 V	I_{CBO}	–	–	60	nA
DC current gain I_C = 1 mA, V_{CE} = 10 V	h_{FE}	30	–	–	–

AC characteristics					
Transition frequency I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz	f_T	–	700	–	MHz
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{ce}	–	0,35	–	pF
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	–	–	0,85	pF

- For VHF oscillator applications
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 660	
Ordering code	bulk: Q62702-F549	taped: Q62702-F982
Marking	LE	

Maximum ratings

Collector-emitter voltage	V_{CEO}	30	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	4	V
Collector current	I_C	25	mA
Emitter current	I_E	30	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

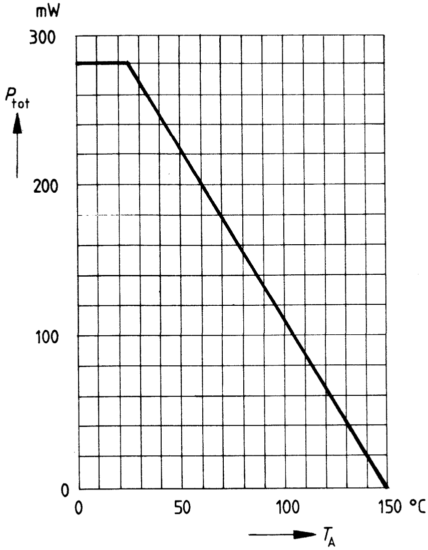
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

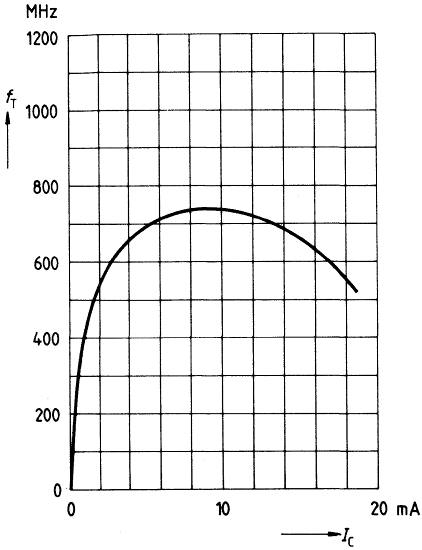
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	30	—	—	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	40	—	—	V
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	4	—	—	V
Collector cutoff current V_{CB} = 20 V, I_E = 0	I_{CBO}	—	—	50	nA
DC current gain I_C = 3 mA, V_{CE} = 10 V	h_{FE}	30	—	—	—

AC characteristics					
Transition frequency I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	700	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	—	0,6	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{ce}	—	0,28	—	pF

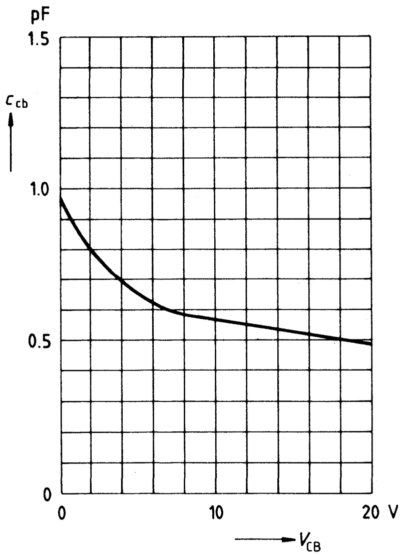
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
$V_{CE} = 10$ V, $f = 100$ MHz

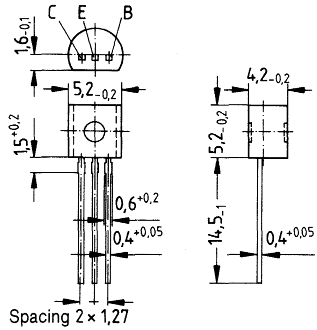


Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



- For low-noise amplifiers and oscillators up to 1 GHz

TO 92



Dimensions in mm

Type	BF 763
Ordering code	Q62702-F766

Maximum ratings

Collector-emitter voltage	V_{CEO}	15	V
Collector-base voltage	V_{CBO}	25	V
Emitter-base voltage	V_{EBO}	3,5	V
Collector current	I_C	25	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	500	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–55...+150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤250	K/W

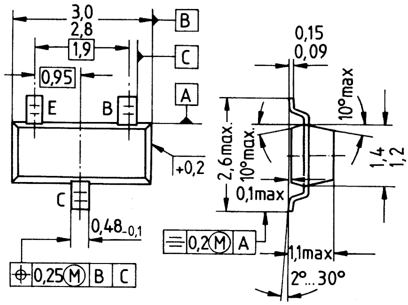
Characteristics (T_A = 25 °C)

DC characteristics		min	typ	max	
Collector-emitter breakdown voltage I_C = 1 mA	$V_{(BR)CEO}$	15	—	—	V
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)CBO}$	25	—	—	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)EBO}$	3,5	—	—	V
Collector cutoff current V_{CB} = 15 V	I_{CBO}	—	—	50	nA
DC current gain I_C = 5 mA, V_{CE} = 10 V	h_{FE}	25	—	250	—
Collector-emitter saturation voltage I_C = 10 mA, I_B = 1 mA	V_{CEsat}	—	—	0,5	V

AC characteristics					
Transition frequency I_C = 5 mA, V_{CE} = 10 V, f = 200 MHz	f_T	—	2000	—	MHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	0,3	—	0,9	pF
Noise figure I_C = 5 mA, V_{CE} = 10 V, R_S = 60 Ω f = 200 MHz 800 MHz	F	 — —	 2,5 5	 — —	 dB dB

- Low-noise broadband transistor for frequencies up to 2 GHz at collector currents up to 30 mA
- For IF amplifiers in TV-sat tuners and for VCR modulators
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 770 A	
Ordering code	bulk: Q62702-F1068	taped: Q62702-F1080
Marking	LS	

Maximum ratings

Collector-emitter voltage	V_{CEO}	12	V
Collector-base voltage	V_{CBO}	15	V
Emitter-base voltage	V_{EBO}	2	V
Collector current	I_C	50	mA
Base current	I_B	10	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65... + 150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1)]

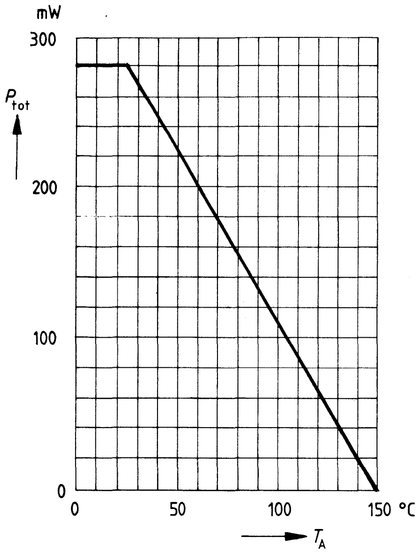
[1)] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

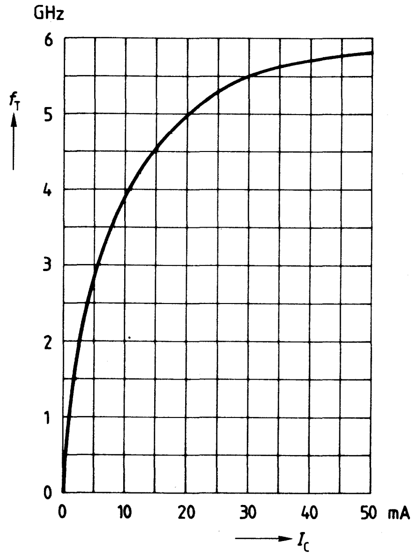
DC characteristics		min	typ	max	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	12	–	–	V
Collector cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	–	–	50	nA
DC current gain I_C = 30 mA, V_{CE} = 5 V	h_{FE}	40	90	–	–
Collector-emitter saturation voltage I_C = 50 mA, I_B = 5 mA	V_{CEsat}	–	0,13	0,5	V

AC characteristics					
Transition frequency I_C = 30 mA, V_{CE} = 5 V, f = 200 MHz	f_T	–	5,5	–	GHz
Collector-base capacitance V_{CB} = 5 V, V_{BE} = 0 V, f = 1 MHz	C_{cb}	–	0,6	–	pF
Collector-emitter capacitance V_{CE} = 5 V, V_{BE} = 0 V, f = 1 MHz	C_{ce}	–	0,3	–	pF
Noise figure I_C = 10 mA, V_{CE} = 5 V, f = 800 MHz	F	–	2	–	dB
Power gain I_C = 30 mA, V_{CB} = 5 V, f = 800 MHz	G_p	–	13	–	dB

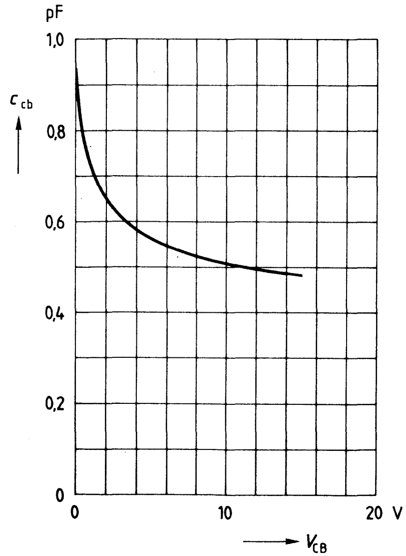
Total power dissipation $P_{tot} = f(T_A)$



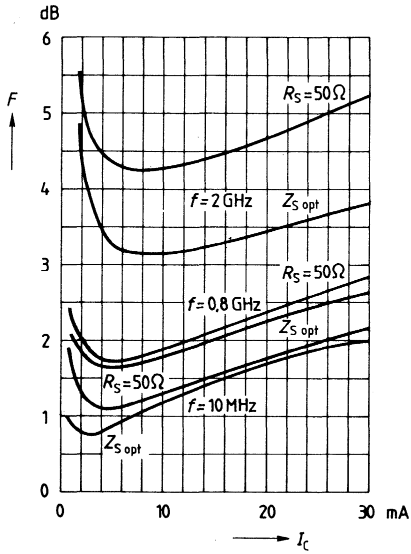
Transition frequency $f_T = f(I_C)$
$V_{CE} = 5$ V, $f = 200$ MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



Noise figure $F = f(I_C)$
$V_{CE} = 8$ V

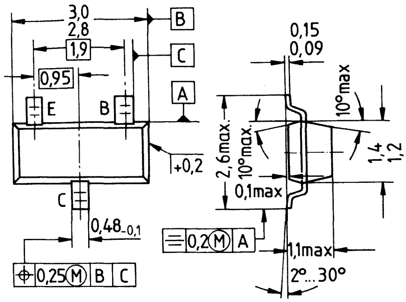


NPN Silicon RF Transistor

BF 775

- For broadband applications up to 2 GHz
- Especially for RF amplifiers, mixers, and oscillators in TV-sat tuners
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 775	
Ordering code	bulk: Q62702-F991	taped: Q62702-F102
Marking	LO	

Maximum ratings

Collector-emitter voltage	V_{CEO}	12	V
Collector-base voltage	V_{CBO}	20	V
Emitter-base voltage	V_{EBO}	2,5	V
Collector current	I_C	30	mA
Base current	I_B	4	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−65... +150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

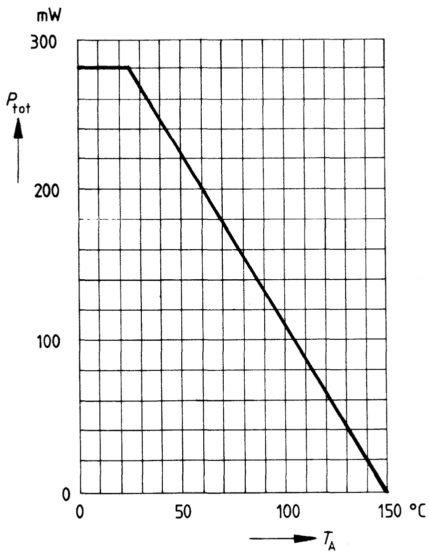
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

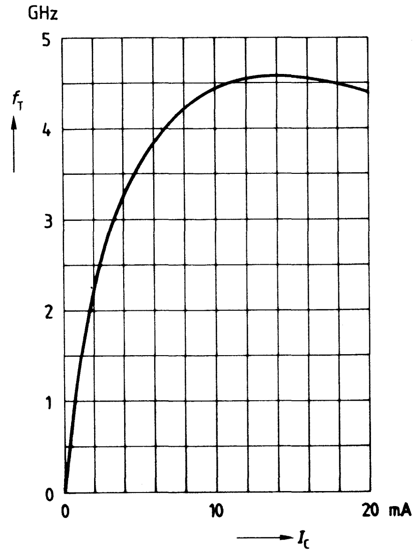
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	12	—	—	V
Collector cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	—	—	50	nA
DC current gain, V_{CE} = 6 V	h_{FE}				
I_C = 5 mA		40	90	250	—
20 mA		40	100	—	—
Collector-emitter saturation voltage I_C = 20 mA, I_B = 2 mA	V_{CEsat}	—	0,16	0,5	V

AC characteristics					
Transition frequency	f_T				
I_C = 5 mA, V_{CE} = 6 V, f = 200 MHz		—	3,5	—	GHz
20 mA 6 V 200 MHz		—	4,5	—	GHz
Collector-base capacitance V_{CB} = 6 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	—	0,58	—	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{ce}	—	0,27	—	pF
Noise figure I_C = 2 mA, V_{CE} = 6 V, f = 800 MHz	F	—	2,1	—	dB

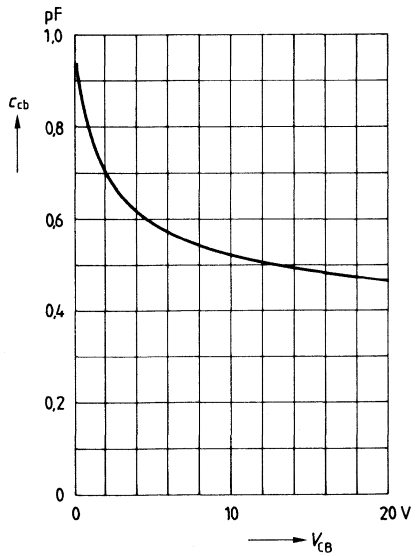
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
$V_{CE} = 6$ V, $f = 200$ MHz

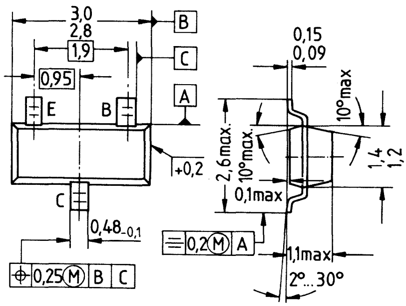


Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz



- For linear broadband amplifier applications up to 500 MHz
- SAW filter driver in TV tuners
- Miniature plastic package for surface mounting (SMD)

SOT 23



Dimensions in mm

Type	BF 799	
Ordering code	bulk: Q62702-F788	taped: Q62702-F935
Marking	LK	

Maximum ratings

Collector-emitter voltage	V_{CEO}	20	V
Collector-emitter reverse voltage	V_{CES}	30	V
Collector-base voltage	V_{CBO}	30	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	35	mA
Peak collector current	I_{CM}	50	mA
Peak base current	I_{BM}	15	mA
Total power dissipation ($T_A \leq 25\,°C$)	P_{tot}	280	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–65...+150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤450	K/W[1]

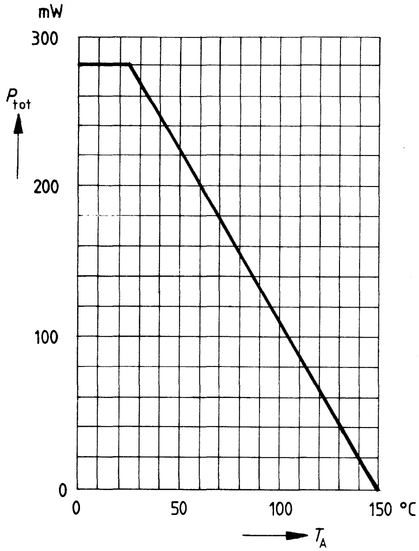
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics (T_A = 25 °C)

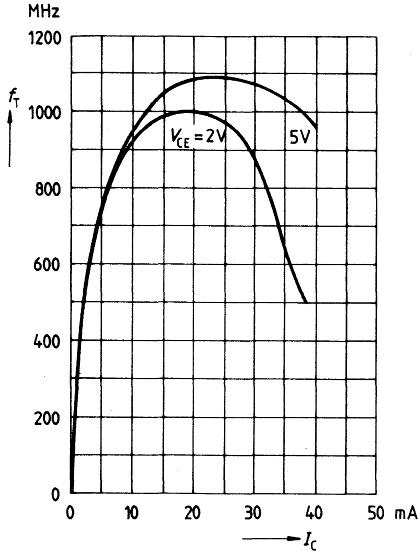
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)\,CEO}$	20	–	–	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)\,CBO}$	30	–	–	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)\,EBO}$	3	–	–	V
Collector cutoff current V_{CB} = 20 V	I_{CBO}	–	–	100	nA
DC current gain, V_{CE} = 10 V	h_{FE}				
I_C = 5 mA		35	95	–	–
20 mA		40	100	250	–
Collector-emitter saturation voltage I_C = 20 mA, I_B = 2 mA	V_{CEsat}	–	0,15	0,5	V
Base-emitter saturation voltage I_C = 20 mA, I_B = 2 mA	V_{BEsat}	–	–	0,95	V

AC characteristics					
Transition frequency	f_T				
I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz		–	800	–	MHz
20 mA, 8 V, 100 MHz		–	1100	–	MHz
Output capacitance V_{CB} = 10 V, f = 1 MHz, I_E = 0	c_{ob}	–	0,96	–	pF
Collector-base capacitance V_{CB} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{cb}	–	0,7	–	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = 0 V, f = 1 MHz	c_{ce}	–	0,28	–	pF
Noise figure I_C = 5 mA, V_{CE} = 10 V, f = 100 MHz R_S = 50 Ω	F	–	3	–	dB
Output conductance I_C = 20 mA, V_{CE} = 10 V, f = 35 MHz	g_{22e}	–	60	–	µS

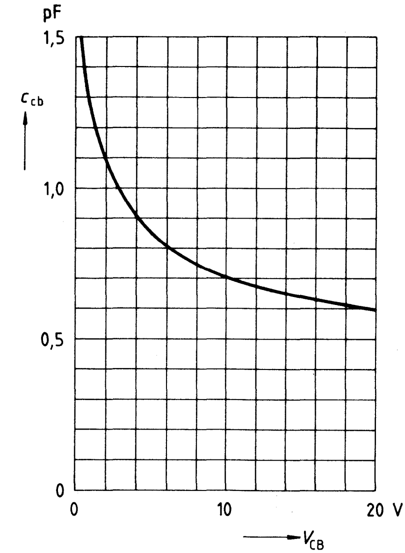
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
f = 100 MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
f = 1 MHz

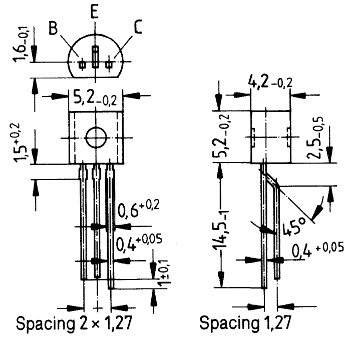


NPN Silicon RF Transistor

BF 959

- For SAW filter driver applications in TV tuners
- For linear broadband VHF amplifier stages
- For oscillator applications

TO 92



Dimensions in mm

Type	BF 959
Ordering code	Q62702-F640

Maximum ratings

Collector-emitter voltage	V_{CEO}	20	V
Collector-emitter reverse voltage	V_{CES}	30	V
Collector-base voltage	V_{CBO}	30	V
Emitter-base voltage	V_{EBO}	3	V
Peak collector current	I_{CM}	100	mA
Peak base current	I_{BM}	30	mA
Total power dissipation ($T_A \leq 25\,°C$, $V_{CE} \leq 15$ V)	P_{tot}	500	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	–55... + 150	°C

Thermal resistance

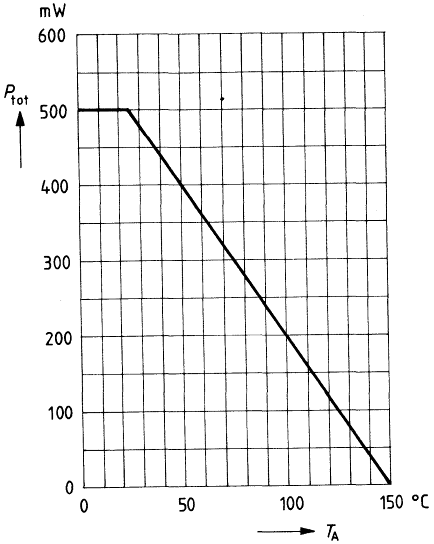
Junction – ambient	R_{thJA}	≤ 250	K/W

Characteristics (T_A = 25 °C)

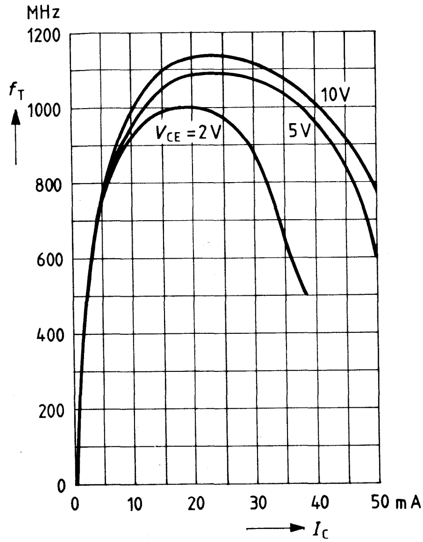
DC characteristics		**min**	**typ**	**max**	
Collector-emitter breakdown voltage I_C = 1 mA	$V_{(BR)\,CEO}$	20	—	—	V
Collector-base breakdown voltage I_C = 10 µA	$V_{(BR)\,CBO}$	30	—	—	V
Emitter-base breakdown voltage I_E = 10 µA	$V_{(BR)\,EBO}$	3	—	—	V
Collector cutoff current V = 20 V	I_{CBO}	—	—	100	nA
DC current gain, V_{CE} = 10 V	h_{FE}				
I_C = 5 mA		35	—	—	—
20 mA		40	85	—	—
Base-emitter voltage I_C = 20 mA, V_{CE} = 10 V	V_{BE}	—	0,75	—	V
Collector-emitter saturation voltage I_C = 30 mA, I_B = 2 mA	V_{CEsat}	—	—	1	V
Base-emitter saturation voltage I_C = 30 mA, I_B = 2 mA	V_{BEsat}	—	—	0,95	V

AC characteristics					
Transition frequency	f_T				
I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz		700	1100	—	MHz
30 mA, 5 V		600	—	—	MHz
Output capacitance V_{CB} = 10 V, I_E = 0, f = 1 MHz	c_{obo}	—	0,9	—	pF
Collector-base capacitance V_{CE} = 10 V, V_{BE} = 0, f = 1 MHz	c_{cb}	—	0,75	—	pF
Noise figure V_{CE} = 10 V, f = 200 MHz, R_S = 60 Ω	F				
I_C = 5 mA		—	3	—	dB
20 mA		—	4	—	dB
Output conductance I_C = 20 mA, V_{CE} = 10 V, f = 35 MHz	g_{22e}	—	0,06	—	mS

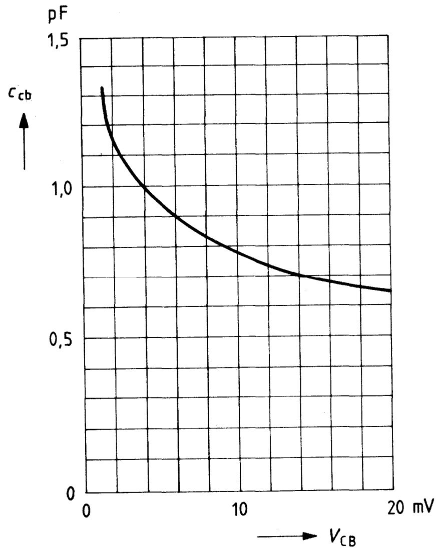
Total power dissipation $P_{tot} = f(T_A)$



Transition frequency $f_T = f(I_C)$
$f = 100$ MHz



Collector-base capacitance $c_{cb} = f(V_{CB})$
$f = 1$ MHz

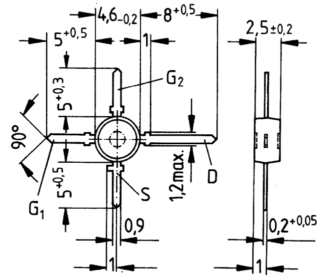


Silicon N Channel MOSFET Tetrode

BF 960

- For amplifier and mixer stages up to 1 GHz in UHF and VHF TV tuners
- Low input and output capacitance

X-plast



Dimensions in mm

Type	BF 960
Ordering code	Q62702-F499

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	$-55 \ldots +150$	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction — ambient	T_{thJA}	≤ 450	K/W

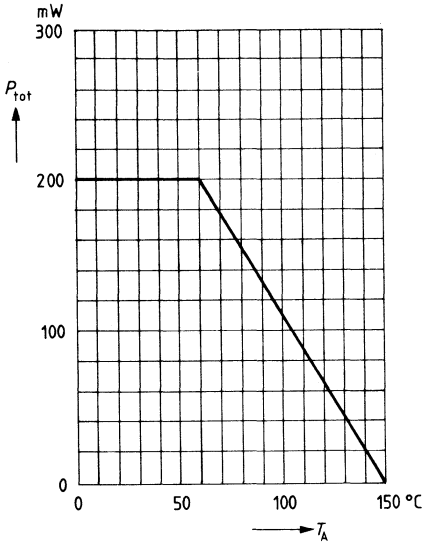
Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage I_D = 10 µA, $-V_{G1S} = -V_{G2S}$ = 4 V	$V_{(BR)\,DS}$	20	—	—	V
Gate 1 source breakdown voltage $\pm I_{G1S}$ = 10 mA, $V_{G2S} = V_{DS}$ = 0	$\pm V_{(BR)\,G1SS}$	8,5	—	17	V
Gate 2 source breakdown voltage $\pm I_{G2S}$ = 10 mA, $V_{G1S} = V_{DS}$ = 0	$\pm V_{(BR)\,G2SS}$	8,5	—	17	V
Gate 1 source leakage current $\pm V_{G1S}$ = 5 V, $V_{G2S} = V_{DS}$ = 0	$\pm I_{G1SS}$	—	—	50	nA
Gate 2 source leakage current $\pm V_{G2S}$ = 5 V, $V_{G1S} = V_{DS}$ = 0	$\pm I_{G2SS}$	—	—	50	nA
Drain current V_{DS} = 15 V, V_{G1S} = 0, V_{G2S} = 4 V	I_{DSS}	2	—	20	mA
Gate 1 source pinch-off voltage V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 20 µA	$-V_{G1S\,(p)}$	—	—	2,7	V
Gate 2 source pinch-off voltage V_{DS} = 15 V, V_{G1S} = 0, I_D = 20 µA	$-V_{G2S\,(p)}$	—	—	2,7	V

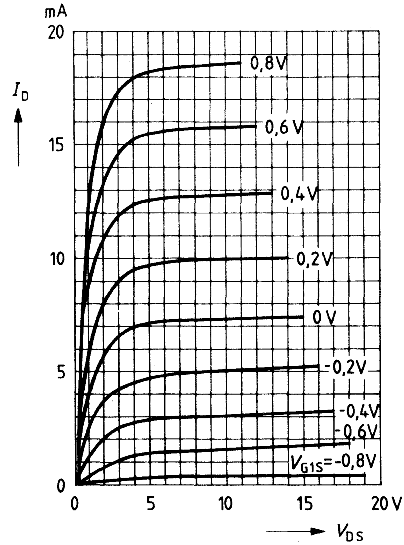
Characteristics (T_A = 25 °C)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance V_{DS} = 15 V, I_D = 7 mA, V_{G2S} = 4 V, f = 1 kHz	g_{fs}	9,5	12	—	mS
Gate 1 input capacitance V_{DS} = 15 V, I_D = 7 mA, V_{G2S} = 4 V, f = 1 MHz	c_{g1ss}	—	1,8	—	pF
Gate 2 input capacitance V_{DS} = 15 V, I_D = 7 mA, V_{G2S} = 4 V, f = 1 MHz	c_{g2ss}	—	1	—	pF
Feedback capacitance V_{DS} = 15 V, I_D = 7 mA, V_{G2S} = 4 V, f = 1 MHz	c_{dg1}	—	25	—	fF
Output capacitance V_{DS} = 15 V, I_D = 7 mA, V_{G2S} = 4 V, f = 1 MHz	c_{dss}	—	0,8	—	pF
Power gain V_{DS} = 15 V, I_D = 7 mA,	G_{ps}				
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS (test circuit 1)		—	23	—	dB
f = 800 MHz, G_G = 3,3 mS, G_L = 1 mS (test circuit 2)		—	16,5	—	dB
Noise figure V_{DS} = 15 V, I_D = 7 mA	F				
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS (test circuit 1)		—	1,6	—	dB
f = 800 MHz, G_G = 3,3 mS, G_L = 1 mS (test circuit 2)		—	2,8	—	dB
Gain control range V_{DS} = 15 V, V_{G2S} = 4...−2 V, f = 800 MHz	ΔG_{ps}	40	—	—	dB
Mixer gain V_{DS} = 15 V, V_{G2S} = 4 V, f = 800 MHz f_{IF} = 36 MHz, 2 Δf_{IF} = 5 MHz, V_{osc} = 800 mV (test circuit 3)	G_{psc}	—	16	—	dB

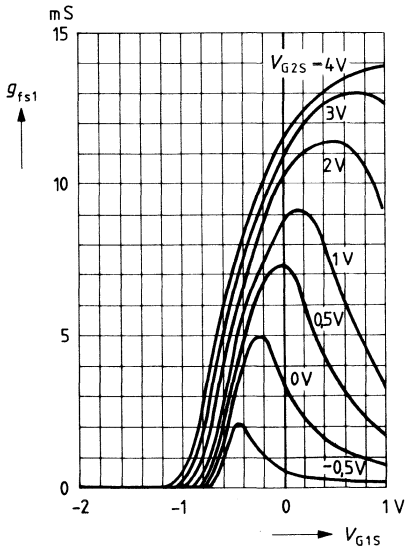
Total power dissipation $P_{tot} = f(T_A)$



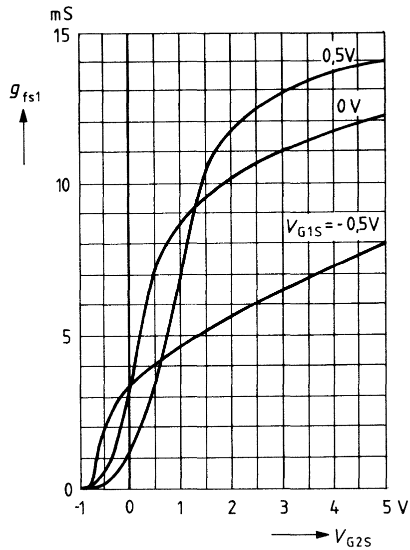
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4\ V$



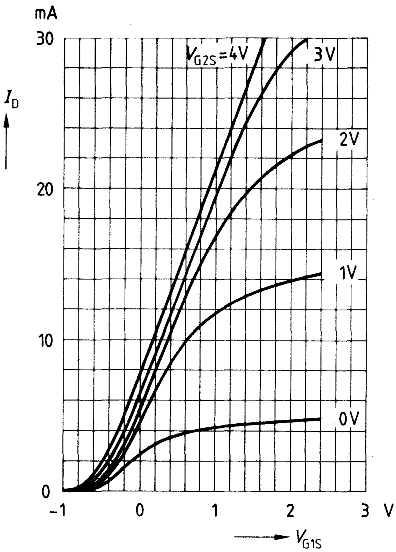
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15\ V$
$I_{DSS} = 7\ mA$, $f = 1\ kHz$



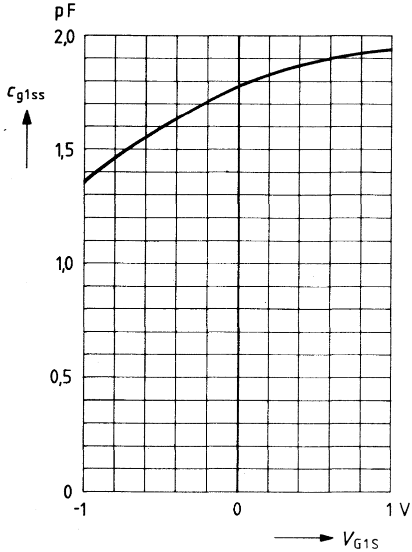
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15\ V$
$I_{DSS} = 7\ mA$, $f = 1\ kHz$



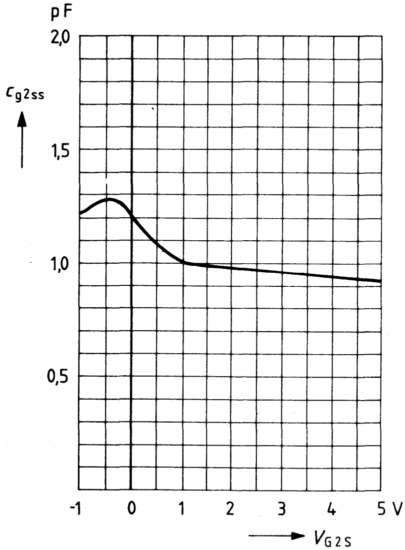
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



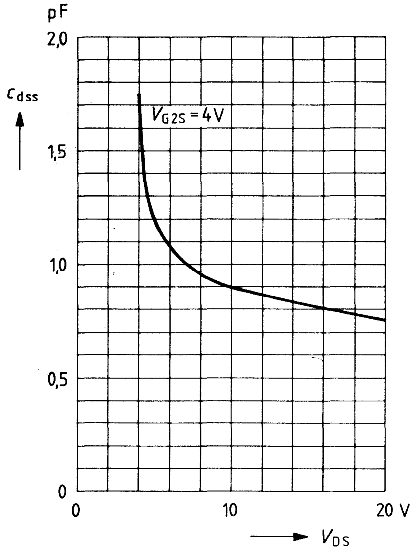
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



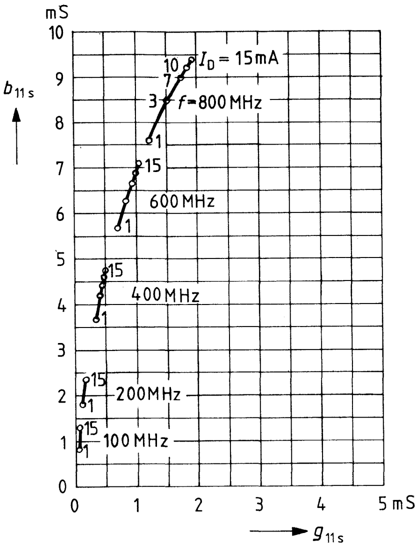
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



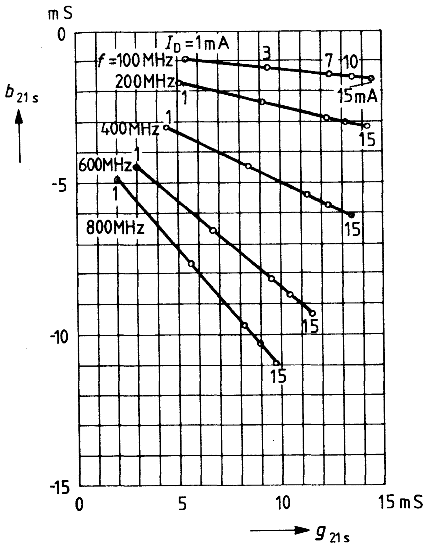
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



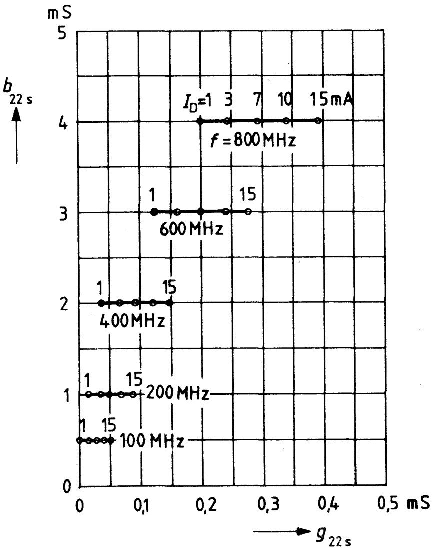
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



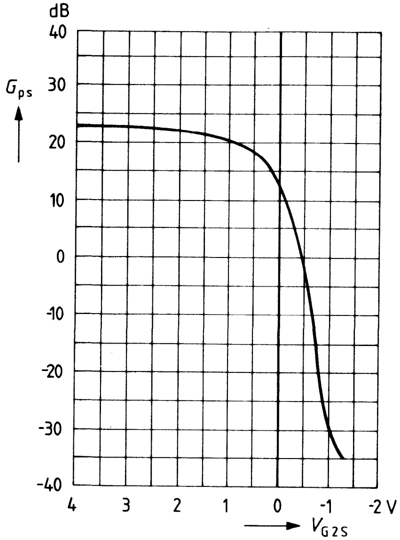
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



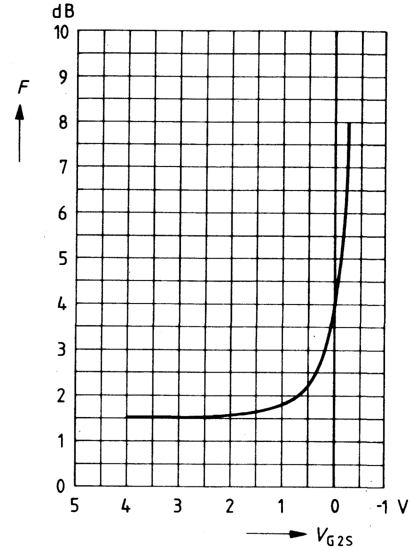
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



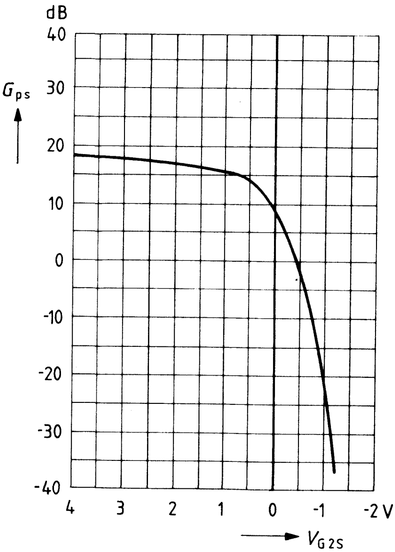
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$, $I_{DSS} = 7$ mA
$f = 200$ MHz (see test circuit 1)



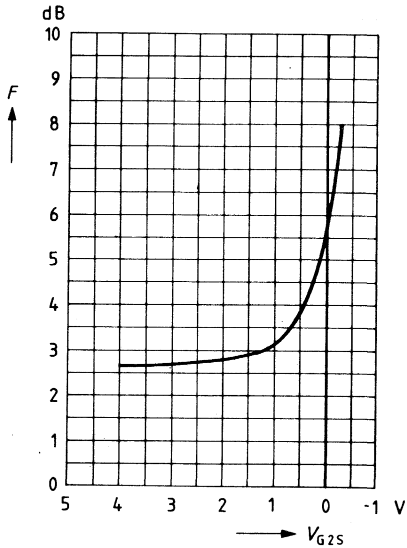
Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$, $I_{DSS} = 7$ mA
$f = 200$ MHz (see test circuit 1)



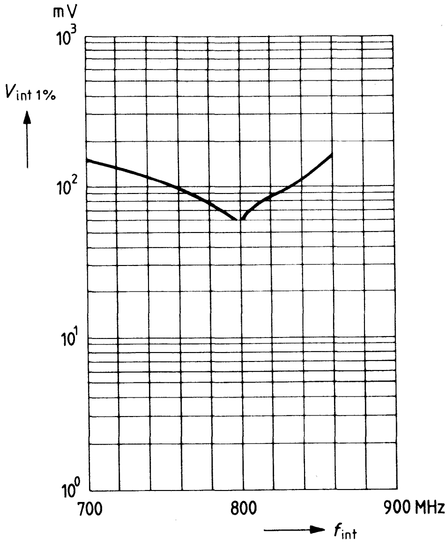
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$, $I_{DSS} = 7$ mA
$f = 800$ MHz, $R_S = 0$ (see test circuit 2)



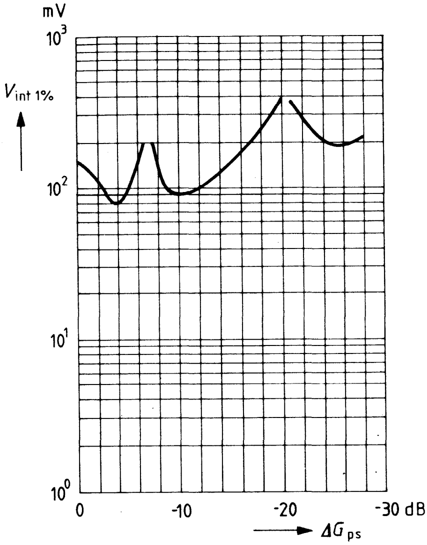
Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$, $I_{DSS} = 7$ mA
$f = 800$ MHz, $R_S = 0$ (see test circuit 2)



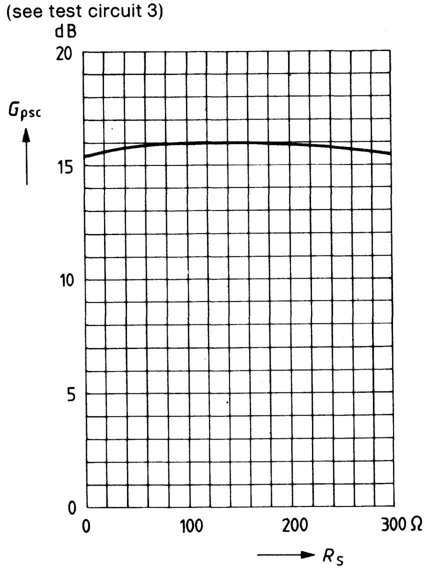
Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(f_{int})$[1)]
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $V_{G1S} = 1$ V
$f = 800$ MHz (see test circuit 2)



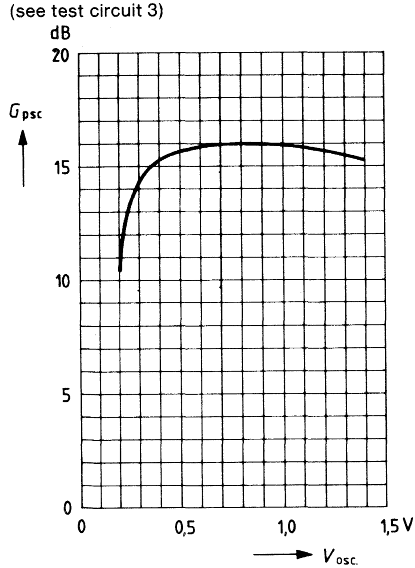
Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(\Delta G_{ps})$[1)]
$V_{DS} = 15$ V, $V_{G1S} = 1$ V, $f = 800$ MHz
$f_{int} = 700$ MHz (see test circuit 2)



Mixer gain $G_{psc} = f(R_S)$
$f = 800$ MHz, $f_{osc} = 836$ MHz, $V_{osc} = 800$ mV
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $I_{DSS} = 7$ mA
(see test circuit 3)

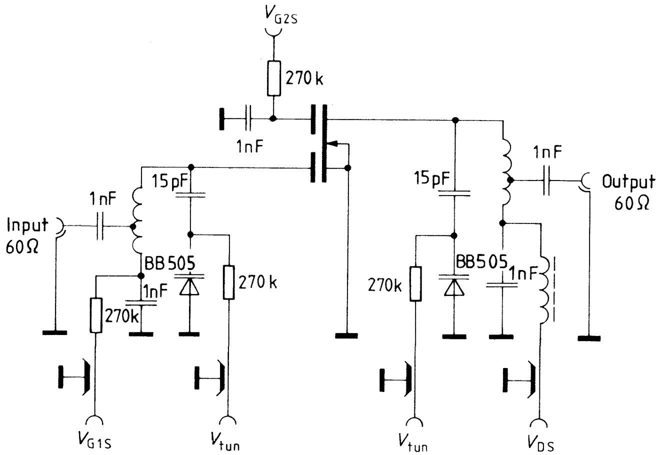


Mixer gain $G_{psc} = f(V_{osc})$
$f = 800$ MHz, $f_{osc} = 836$ MHz, $R_S = 150\ \Omega$
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $I_{DSS} = 7$ mA
(see test circuit 3)

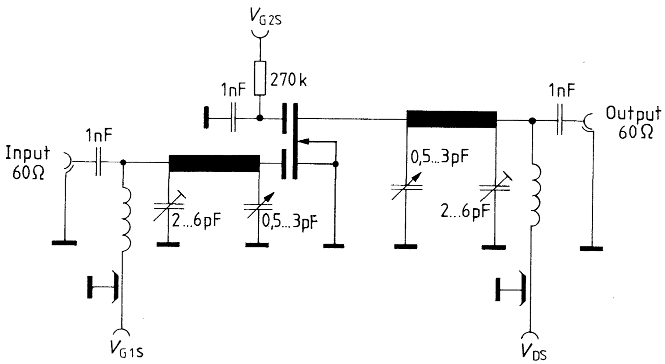


1) Footnote see page 151

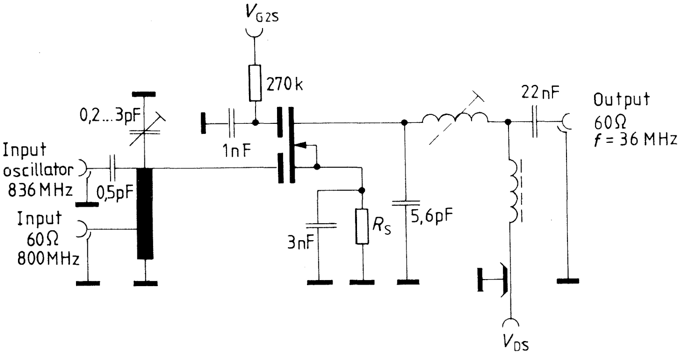
Test circuit 1 for power gain and noise figure
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



Test circuit 2 for power gain, noise figure and cross modulation
f = 800 MHz, G_G = 3,3 mS, G_L = 1,0 mS



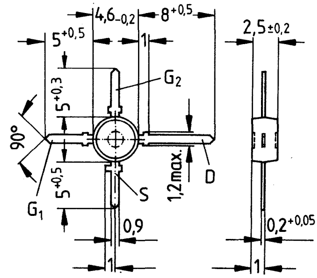
Test circuit 3 for mixer gain
f = 800/36 MHz



1) $V_{\text{Int (1\%)}}$ is the rms value of half the emf (terminal voltage at matching) of a 100% sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1% amplitude modulation on the active carrier.

- For input and mixer stages in FM and VHF TV tuners

X-plast



Dimensions in mm

Type	BF 961
Ordering code	Q62702-F518

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	–55...+150	°C
Channel temperature	T_{ch}	150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤450	K/W

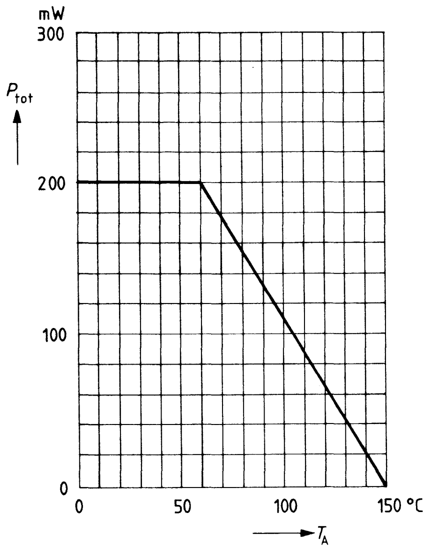
Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage I_D = 10 µA, $-V_{G1S} = -V_{G2S}$ = 4 V	$V_{(BR)\,DS}$	20	—	—	V
Gate 1 source breakdown voltage $\pm I_{G1S}$ = 10 mA, $V_{G2S} = V_{DS}$ = 0	$\pm V_{(BR)\,G1SS}$	8,5	—	17	V
Gate 2 source breakdown voltage $\pm I_{G2S}$ = 10 mA, $V_{G1S} = V_{DS}$ = 0	$\pm V_{(BR)\,G2SS}$	8,5	—	17	V
Gate 1 source leakage current $\pm V_{G1S}$ = 5 V, $V_{G2S} = V_{DS}$ = 0	$\pm I_{G1SS}$	—	—	50	nA
Gate 2 source leakage current $\pm V_{G2S}$ = 5 V, $V_{G1S} = V_{DS}$ = 0	$\pm I_{G2SS}$	—	—	50	nA
Drain current V_{DS} = 15 V, V_{G1S} = 0, V_{G2S} = 4 V	I_{DSS}	4	—	20	mA
Gate 1 source pinch-off voltage V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 20 µA	$-V_{G1S\,(p)}$	—	—	3,5	V
Gate 2 source pinch-off voltage V_{DS} = 15 V, V_{G1S} = 0, I_D = 20 µA	$-V_{G2S\,(p)}$	—	—	3,5	V

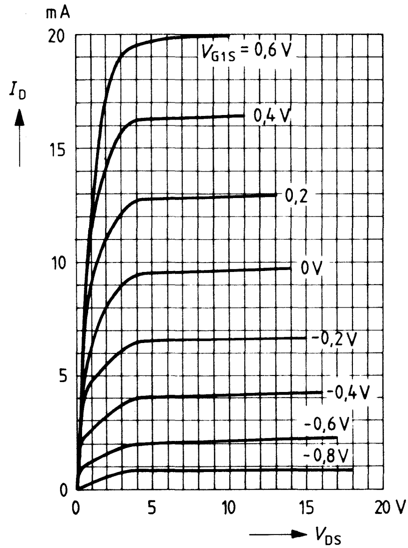
Characteristics ($T_A = 25\,°C$)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance $V_{DS} = 15$ V, $I_D = 10$ mA, $V_{G2S} = 4$ V, $f = 1$ kHz	g_{fs}	12	17	–	mS
Gate 1 input capacitance $V_{DS} = 15$ V, $I_D = 10$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{g1ss}	–	3,6	–	pF
Gate 2 input capacitance $V_{DS} = 15$ V, $I_D = 10$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{g2ss}	–	1,6	–	pF
Feedback capacitance $V_{DS} = 15$ V, $I_D = 10$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{dg1}	–	25	–	fF
Output capacitance $V_{DS} = 15$ V, $I_D = 10$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{dss}	–	1,6	–	pF
Power gain $V_{DS} = 15$ V, $I_D = 10$ mA $f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS $2\Delta f = 12$ MHz (test circuit 1)	G_{ps}	–	23	–	dB
Noise figure $V_{DS} = 15$ V, $I_D = 10$ mA $f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS (test circuit 1)	F	–	1,1	–	dB
Gain control range $V_{DS} = 15$ V, $V_{G2S} = 4 \ldots -2$ V, $f = 200$ MHz (test circuit 1)	ΔG_{ps}	–	50	–	dB
Mixer gain (additive) $V_{DS} = 15$ V, $V_{G2S} = 6$ V, $R_S = 220\,\Omega$ $f = 200$ MHz, $f_{IF} = 36$ MHz $2\Delta f_{IF} = 5$ MHz, $V_{osc} = 0{,}5$ V (test circuit 2)	G_{psc}	–	16	–	dB
Mixer gain (multiplicative) $V_{DS} = 15$ V, $V_{G1S} = 1{,}7$ V, $V_{G2S} = 2{,}5$ V $R_S = 220\,\Omega$, $f = 200$ MHz, $f_{IF} = 36$ MHz $2\Delta f_{IF} = 5$ MHz, $V_{osc} = 2$ V (test circuit 3)	G_{psc}	–	18	–	dB

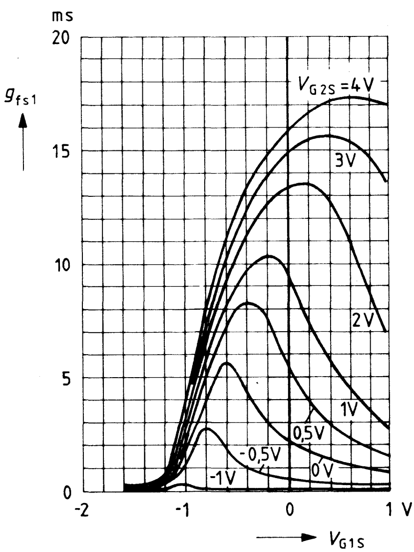
Total power dissipation $P_{tot} = f(T_A)$



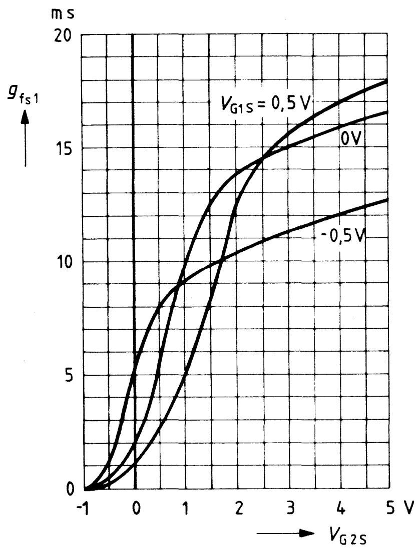
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



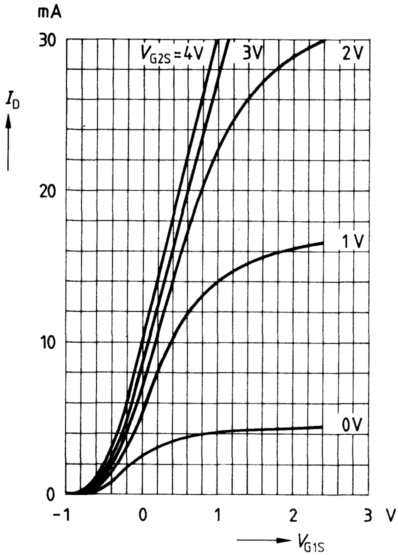
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



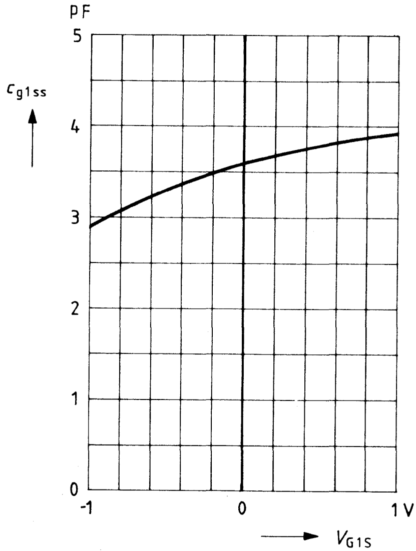
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



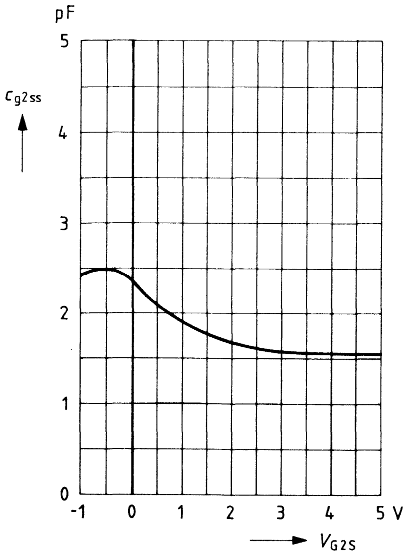
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15\ V$



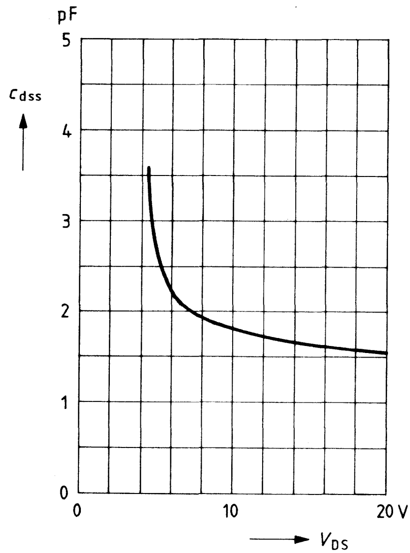
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



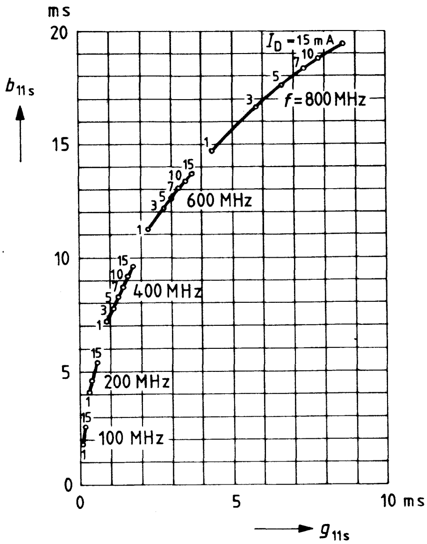
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



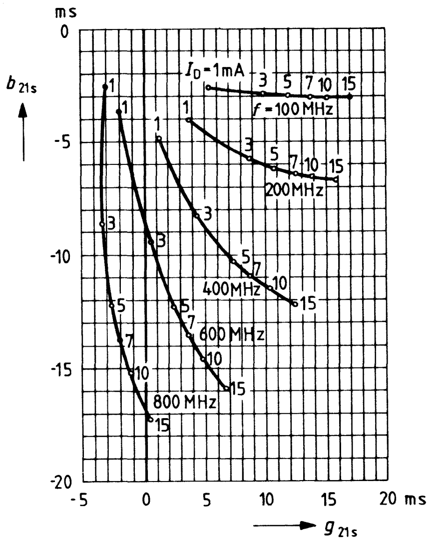
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0\ V$, $V_{G2S} = 4\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



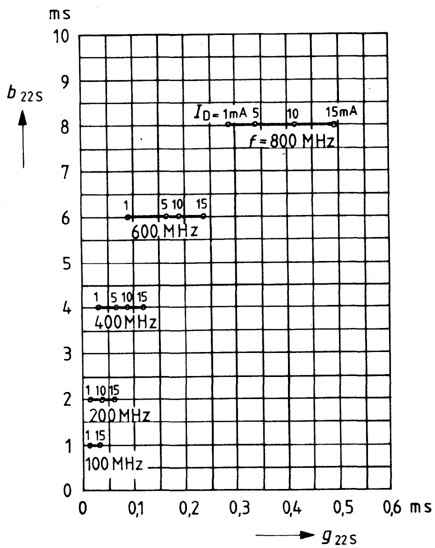
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



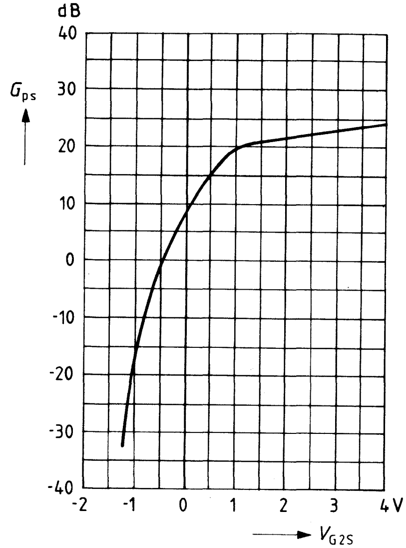
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



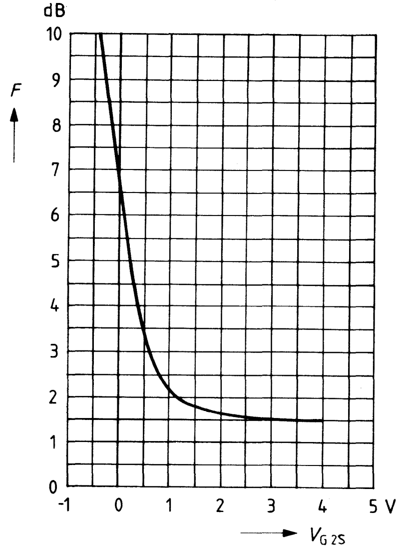
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



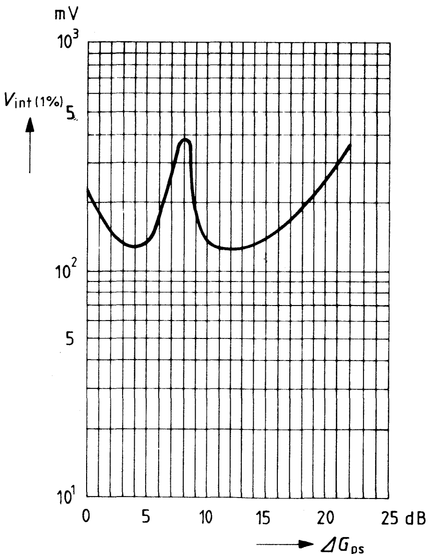
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 200 MHz (see test circuit 1)



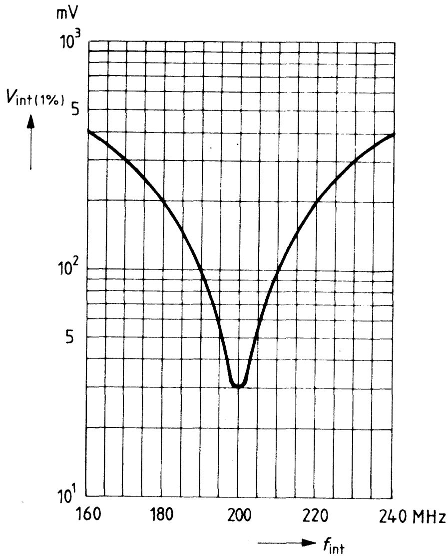
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 200 MHz, (see test circuit 1)



Interference voltage for 1% cross modulation
$V_{int\ (1\%)} = f(\Delta G_{psc})$ [1]
V_{DS} = 15 V, V_{G1S} = 0, f = 200 MHz
f_{int} = 221 MHz (see test circuit 1)

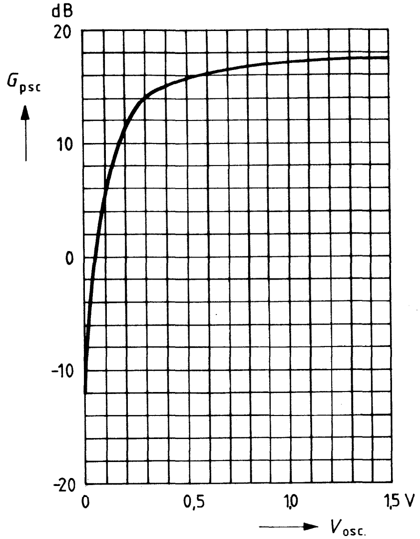


Interference voltage for 1% cross modulation
$V_{int\ (1\%)} = f(f_{int})$ [1]
V_{DS} = 15 V, V_{G2S} = 4 V, V_{G1S} = 0
f = 200 MHz (see test circuit 1)

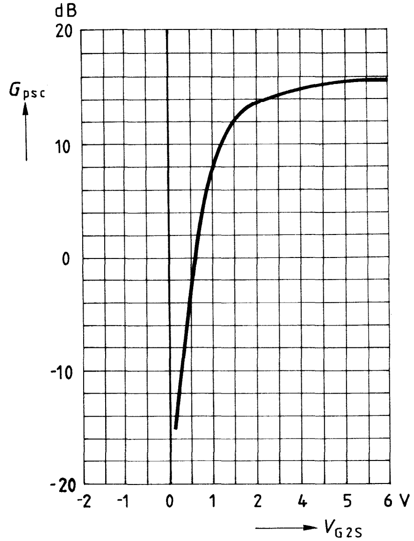


[1] Footnote see page 161

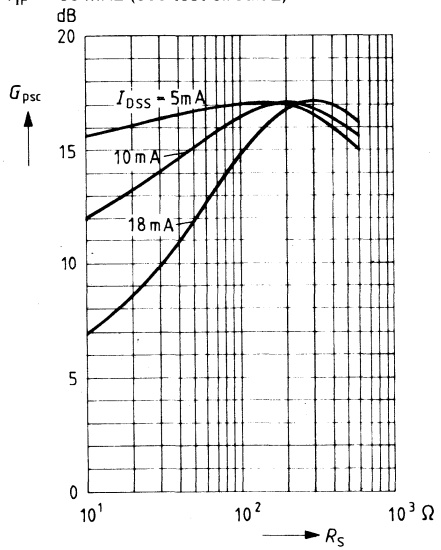
Mixer gain (additive) $G_{psc} = f(V_{osc})$
V_D = 15 V, V_{G1S} = 0, V_{G2S} = 6 V
R_S = 220 Ω, I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



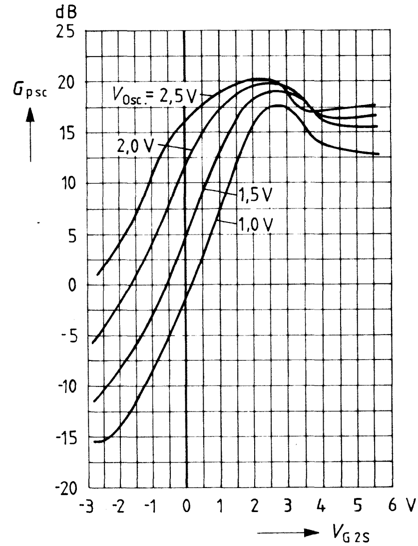
Mixer gain (additive) $G_{psc} = f(V_{G2S})$
V_D = 15 V, V_{G1S} = 0, R_S = 220 Ω
V_{osc} = 0,5 V, I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



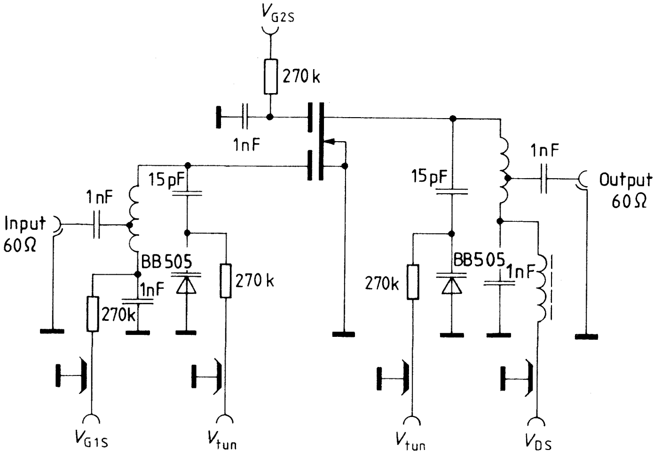
Mixer gain (additive) $G_{psc} = f(R_S)$
V_D = 15 V, V_{G1S} = 0, V_{G2S} = 6 V
V_{osc} = 0,5 V, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



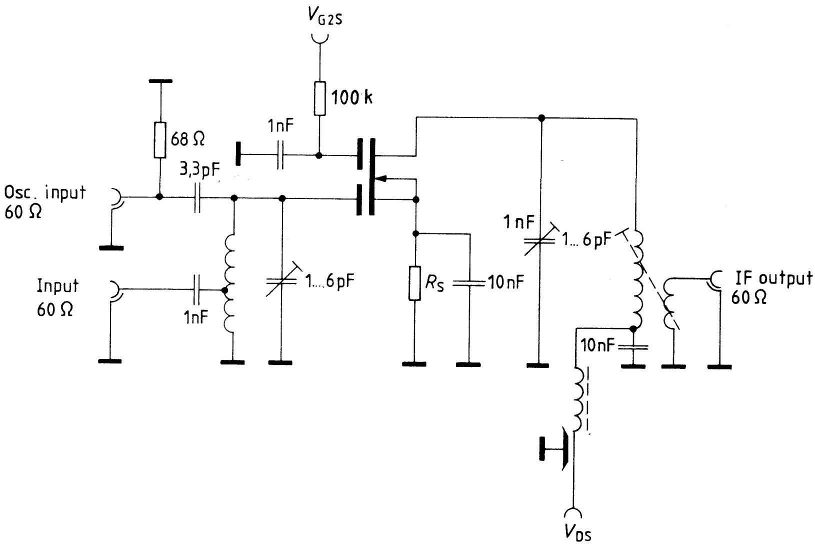
Mixer gain (multiplicative) $G_{psc} = f(V_{G2S})$
V_D = 15 V, V_{G1S} = 1,7 V, R_S = 200 Ω
I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 3)



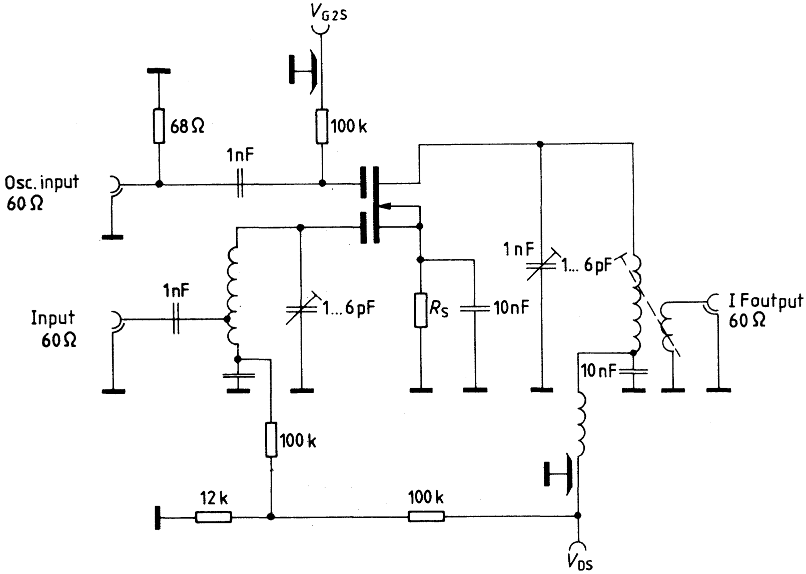
Test circuit 1 for power gain, noise figure and cross modulation
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



Test circuit 2 for mixer gain (additive)
f = 200 MHz, f_{osc} = 236 MHz, 2 Δf_{IF} = 5 MHz



Test circuit 3 for mixer gain (multiplicative)
f = 200 MHz, f_{osc} = 236 MHz, 2 Δf_{IF} = 5 MHz

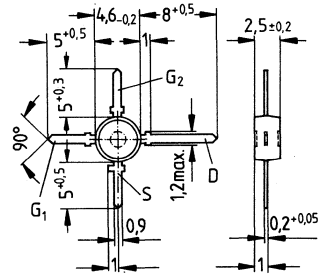


[1] $V_{int\ (1\%)}$ is the rms value of half the emf (terminal voltage at matching) of a 100% sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1% amplitude modulation on the active carrier.

Silicon N Channel MOSFET Tetrode BF 963

- For high-gain, low-distortion VHF TV and FM mixer and input stages

X-plast



Dimensions in mm

Type	BF 963
Ordering code	Q62702-F904

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	50	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

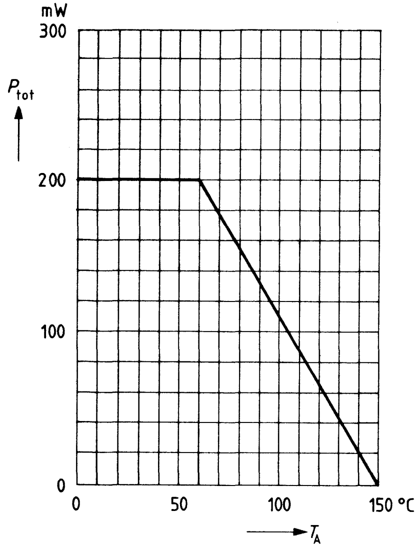
Junction — ambient	R_{thJA}	≤450	K/W

Characteristics ($T_A = 25\,°C$)

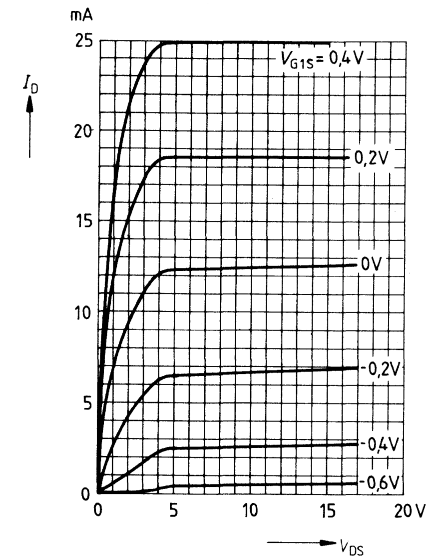
DC characteristics		min	typ	max	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\ DS}$	20	—	—	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\ G1SS}$	8,5	—	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\ G2SS}$	8,5	—	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	—	—	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	—	—	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	6	—	40	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\ (p)}$	—	—	3,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\ (p)}$	—	—	3,0	V

AC characteristics					
Forward transconductance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ kHz$	g_{fs}	16	25	—	mS
Gate 1 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g1ss}	—	6	—	pF
Gate 2 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g2ss}	—	2,5	—	pF
Feedback capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dg1}	—	50	—	fF
Output capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dss}	—	2,5	—	pF
Power gain $V_{DS} = 15\ V,\ I_D = 10\ mA,$ $f = 200\ MHz,\ G_G = 2{,}5\ mS,\ G_L = 0{,}8\ mS$ $2\Delta f = 12\ MHz$ (test circuit)	G_{ps}	—	25	—	dB
Noise figure $V_{DS} = 15\ V,\ I_D = 10\ mA$ $f = 200\ MHz,\ G_G = 2{,}5\ mS,\ G_L = 0{,}8\ mS$ (test circuit)	F	—	1,5	—	dB

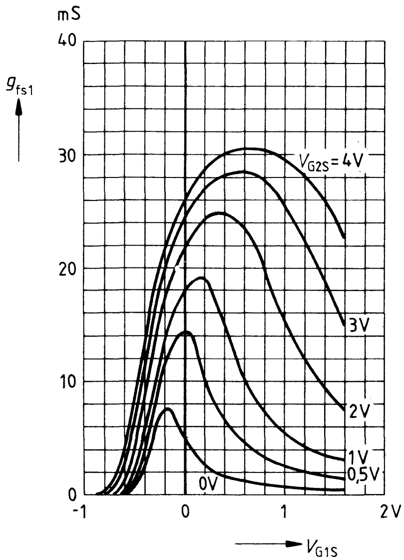
Total power dissipation $P_{tot} = f(T_A)$



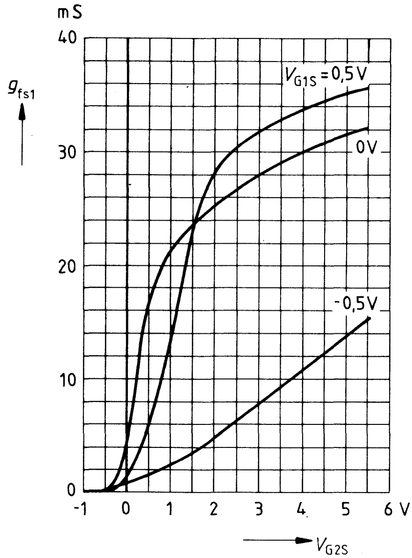
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4\ V$



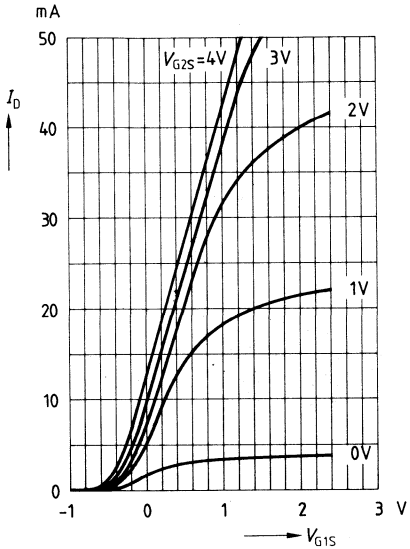
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ kHz$



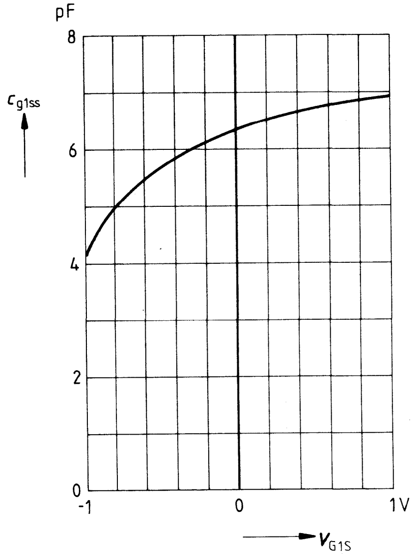
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ kHz$



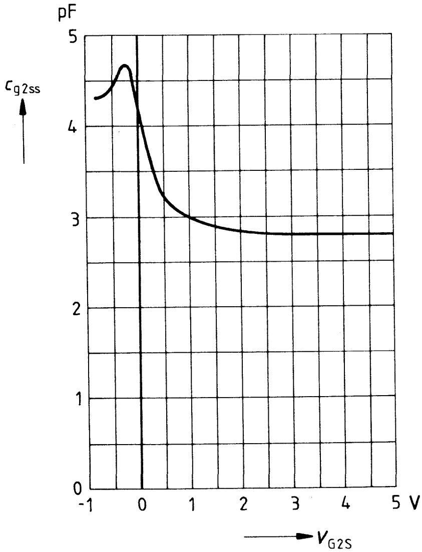
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15\ V$



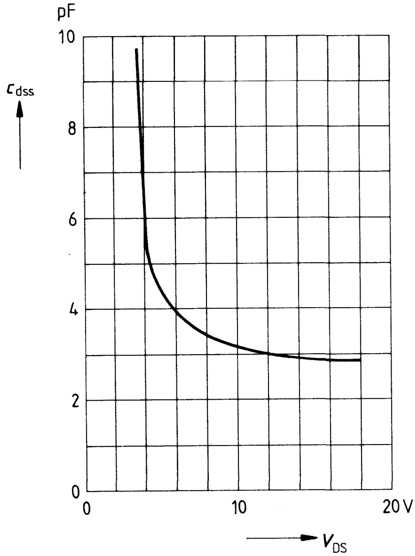
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



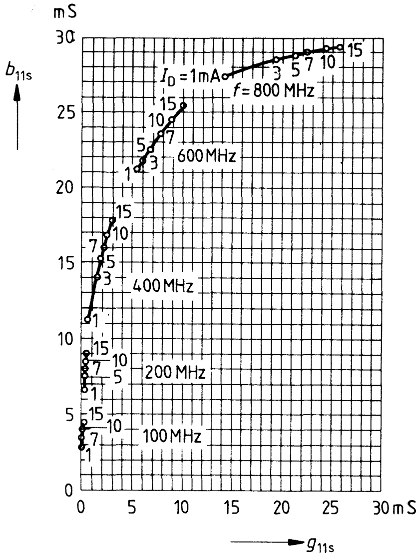
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



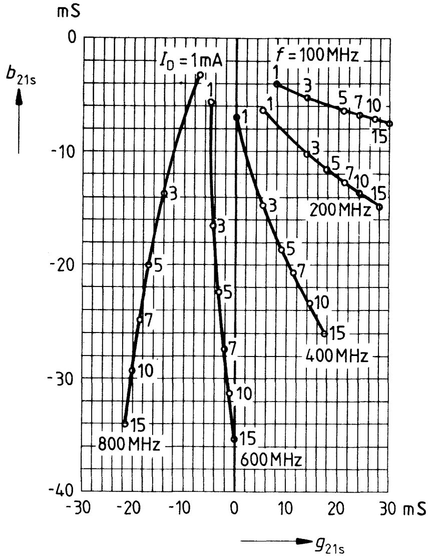
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0\ V$, $V_{G2S} = 4\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



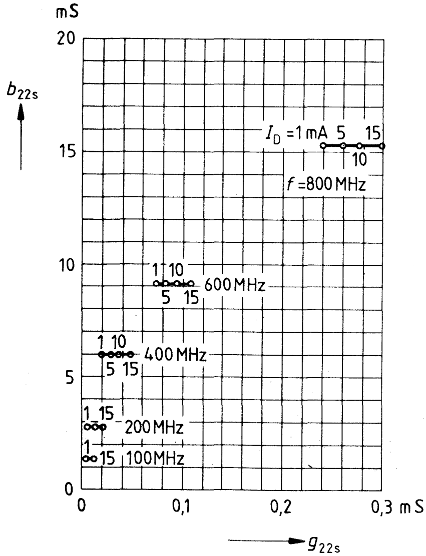
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



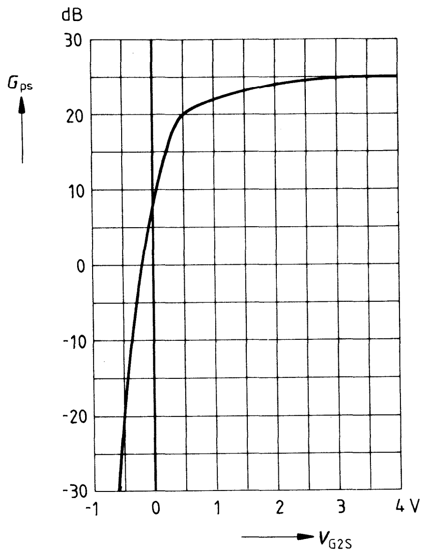
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



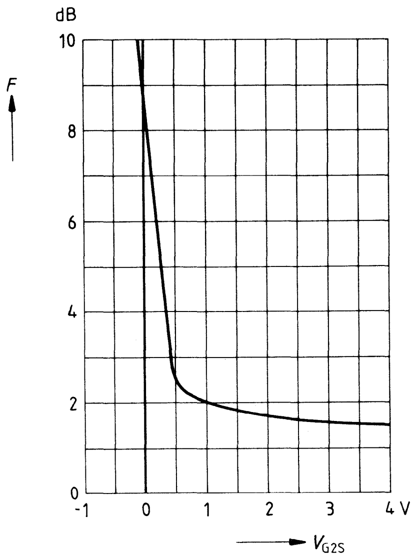
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



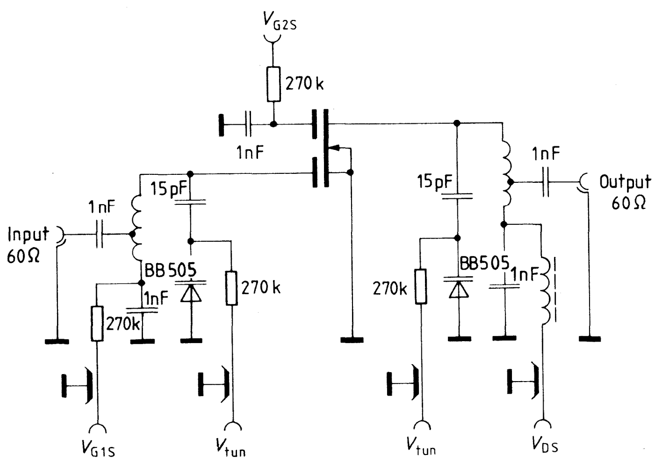
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V
I_{DSS} = 10 mA, f = 200 MHz
(see test circuit)



Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V
I_{DSS} = 10 mA, f = 200 MHz
(see test circuit)

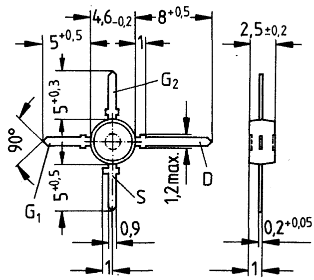


Test circuit for power gain and noise figure
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



- For VHF applications, especially for input and mixer stages with a wide tuning range, e.g. in CATV tuners

X-plast



Dimensions in mm

Type	BF 964 S
Ordering code	Q62702-F446

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

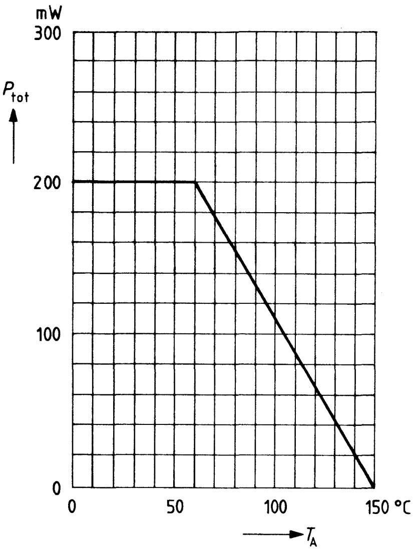
Junction — ambient	R_{thJA}	≤450	K/W

Characteristics ($T_A = 25\,°C$)

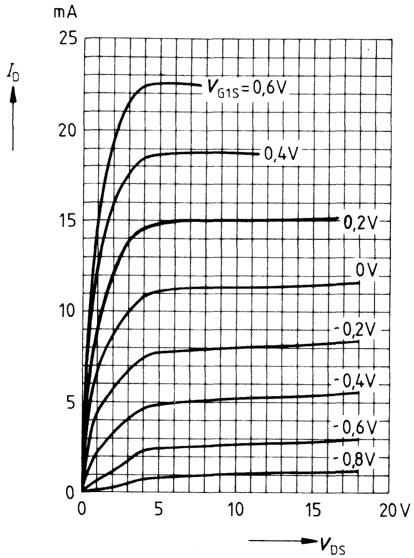
DC characteristics		min	typ	max	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	2	–	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\,(p)}$	–	–	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\,(p)}$	–	–	2,0	V

AC characteristics					
Forward transconductance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ kHz$	g_{fs}	15	18	–	mS
Gate 1 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g1ss}	–	2,5	–	pF
Gate 2 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g2ss}	–	1,2	–	pF
Feedback capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dg1}	–	25	–	fF
Output capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dss}	–	1	–	pF
Power gain $V_{DS} = 15\ V,\ I_D = 10\ mA,$ $f = 200\ MHz,\ G_G = 2\ mS,\ G_L = 0{,}5\ mS$ (test circuit)	G_{ps}	–	25	–	dB
Noise figure $V_{DS} = 15\ V,\ I_D = 10\ mA$ $f = 200\ MHz,\ G_G = 2\ mS,\ G_L = 0{,}5\ mS$ (test circuit)	F	–	1	–	dB
Gain control range $V_{DS} = 15\ V,\ V_{G2S} = 4 \ldots -2\ V,\ f = 200\ MHz$ (test circuit)	ΔG_{ps}	50	–	–	dB

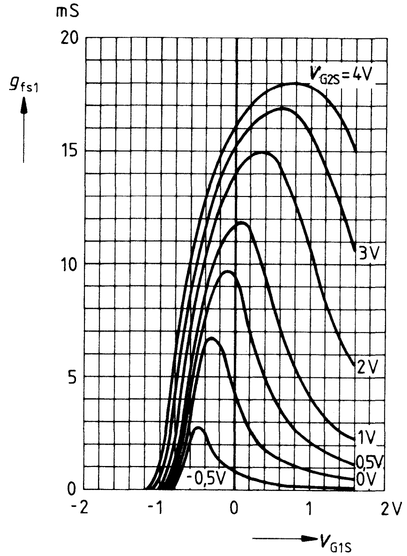
Total power dissipation $P_{tot} = f(T_A)$



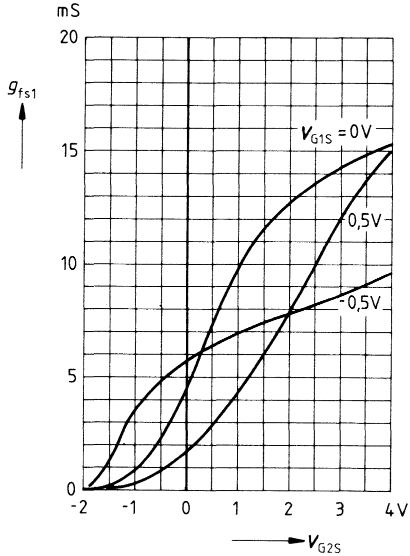
Output characteristics $I_D = f(V_{DS})$



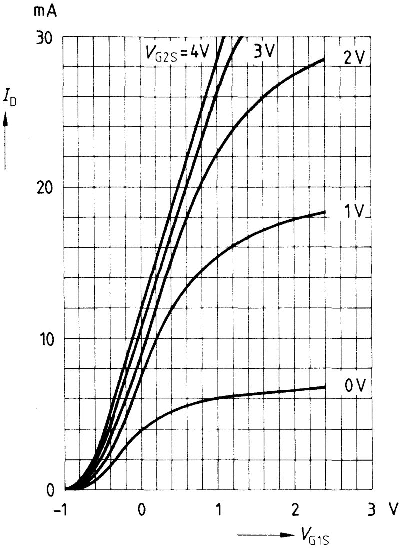
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



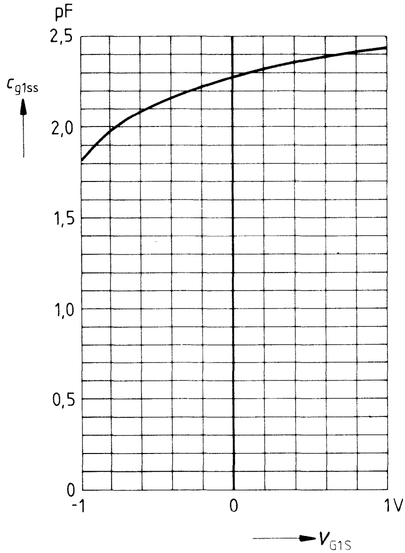
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



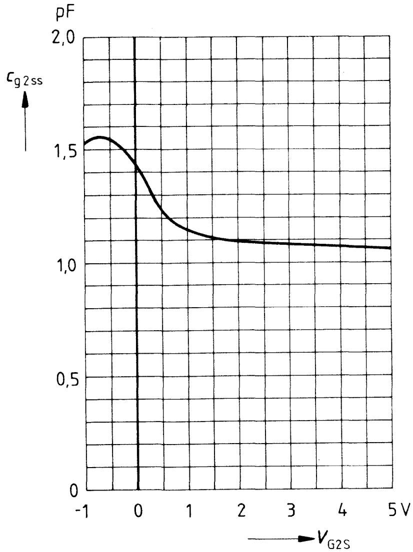
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



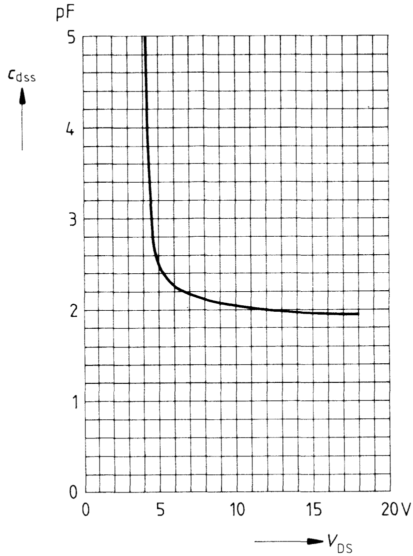
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



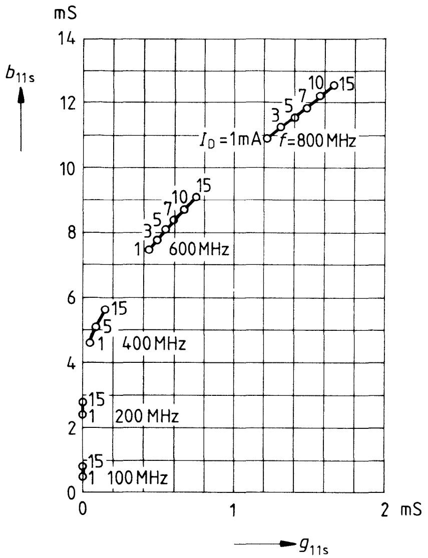
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



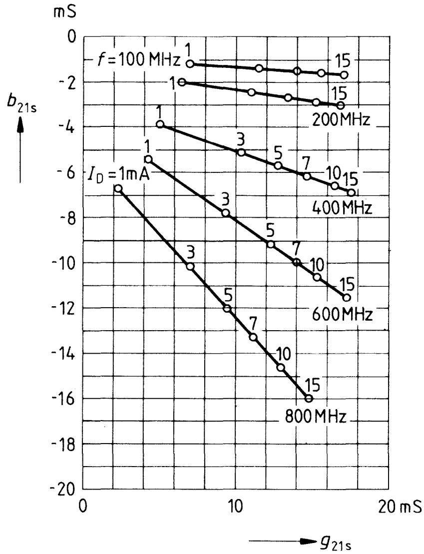
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



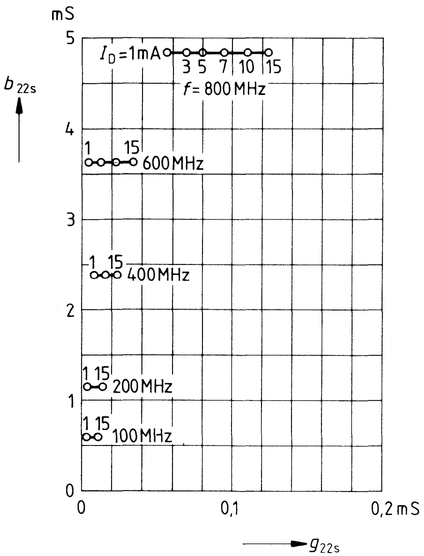
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



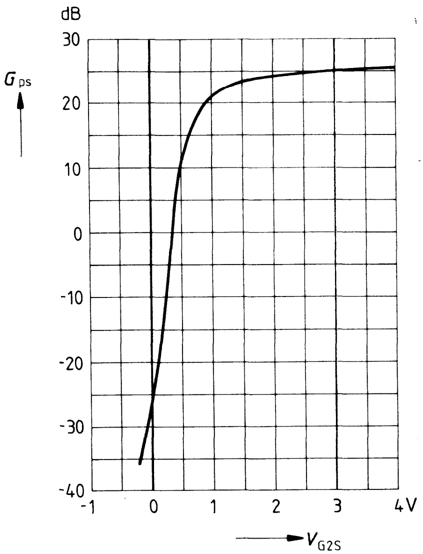
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



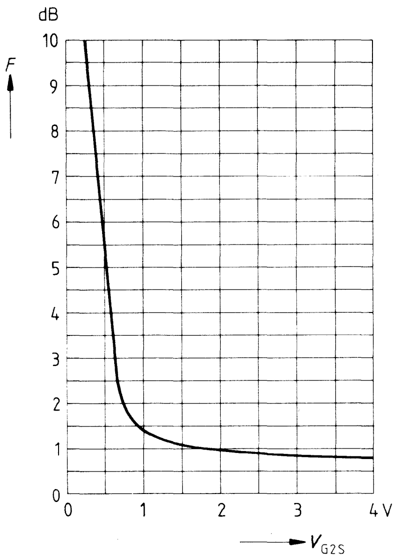
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



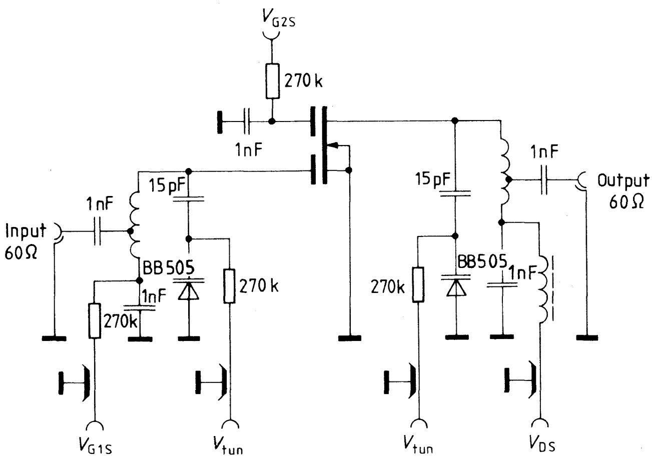
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15\ V$, $V_{G1S} = 0\ V$
$I_{DSS} = 10\ mA$, $f = 200\ MHz$
(see test circuit)



Noise figure $F = f(V_{G2S})$
$V_{DS} = 15\ V$, $V_{G1S} = 0\ V$
$I_{DSS} = 10\ mA$, $f = 200\ MHz$
(see test circuit)

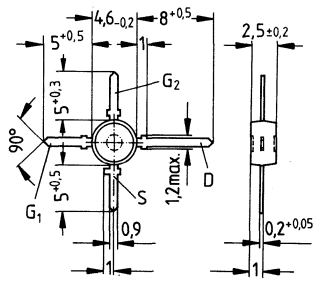


Test circuit for power gain and noise figure
$f = 200\ MHz$, $G_G = 2\ mS$, $G_L = 0{,}5\ mS$



- Integrated suppression network against spurious VHF oscillations
- For VHF applications, especially in TV tuners with extended VHF band, e. g. CATV tuners

X-plast



Dimensions in mm

Type	BF 965
Ordering code	Q62702-F660

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

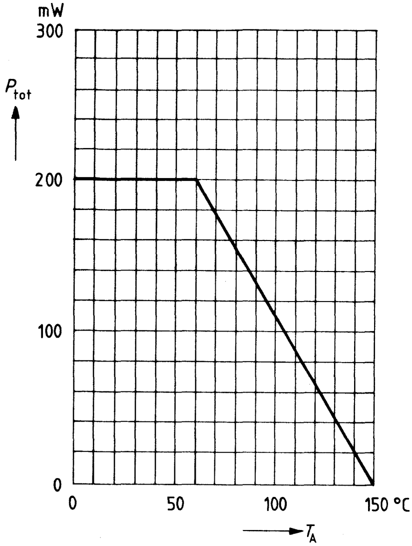
Junction — ambient	R_{thJA}	≤450	K/W

Characteristics ($T_A = 25\,°C$)

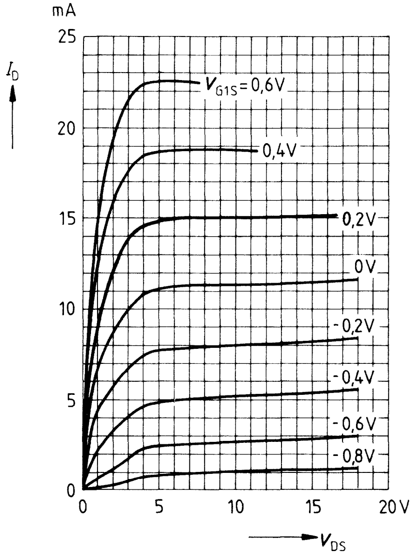
DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\,\mu A$, $-V_{G1S} = -V_{G2S} = 4\,V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\,mA$, $V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\,mA$, $V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\,V$, $V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\,V$, $V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\,V$, $V_{G1S} = 0$, $V_{G2S} = 4\,V$	I_{DSS}	2	–	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\,V$, $V_{G2S} = 4\,V$, $I_D = 20\,\mu A$	$-V_{G1S\,(p)}$	–	–	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\,V$, $V_{G1S} = 0$, $I_D = 20\,\mu A$	$-V_{G2S\,(p)}$	–	–	2,0	V

AC characteristics					
Forward transconductance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,kHz$	g_{fs}	15	18	–	mS
Gate 1 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{g1ss}	–	2,5	–	pF
Gate 2 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{g2ss}	–	1,2	–	pF
Feedback capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{dg1}	–	25	–	fF
Output capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{dss}	–	1	–	pF
Power gain $V_{DS} = 15\,V$, $I_D = 10\,mA$, $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit)	G_{ps}	–	25	–	dB
Noise figure $V_{DS} = 15\,V$, $I_D = 10\,mA$ $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit)	F	–	1	–	dB
Gain control range $V_{DS} = 15\,V$, $V_{G2S} = 4 \ldots -2\,V$, $f = 200\,MHz$ (test circuit)	ΔG_{ps}	50	–	–	dB

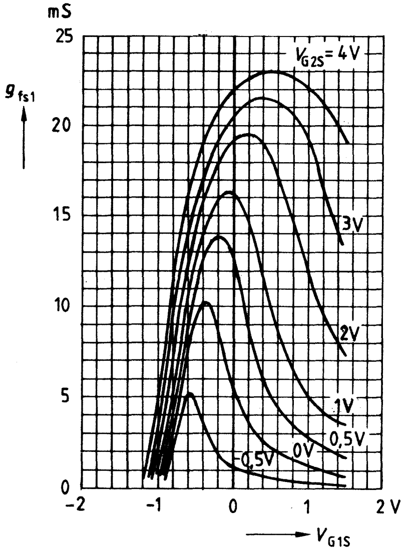
Total power dissipation $P_{tot} = f(T_A)$



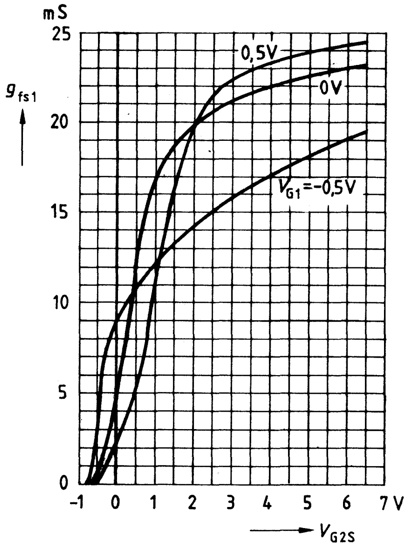
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



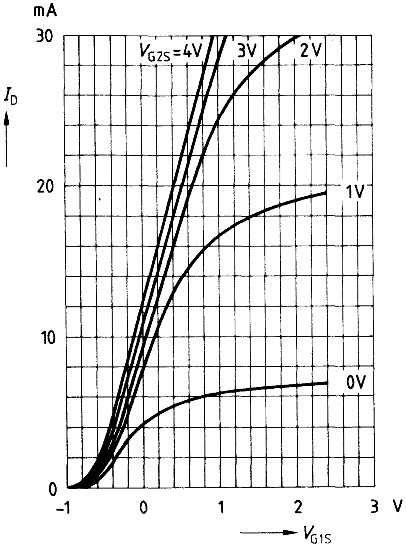
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



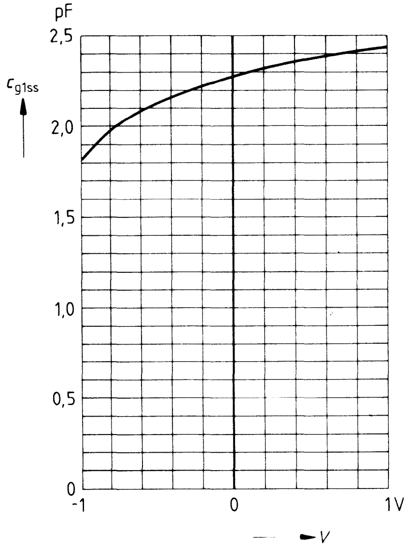
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



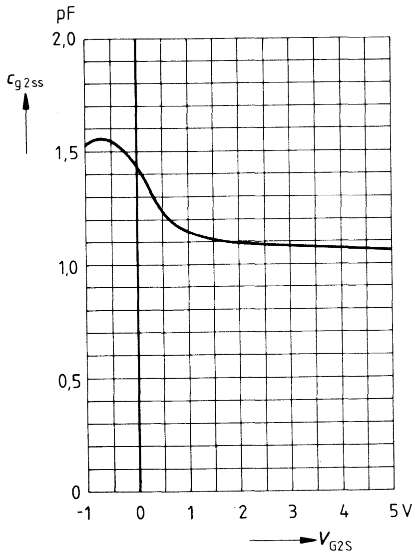
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



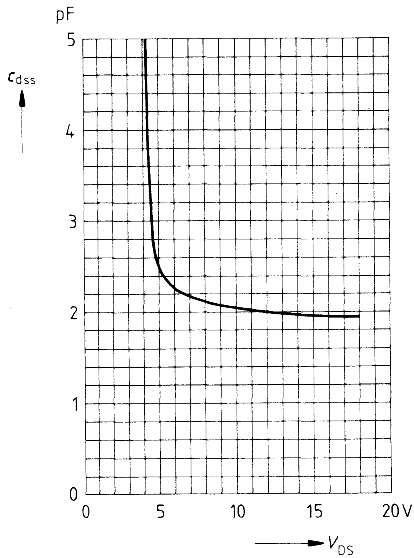
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



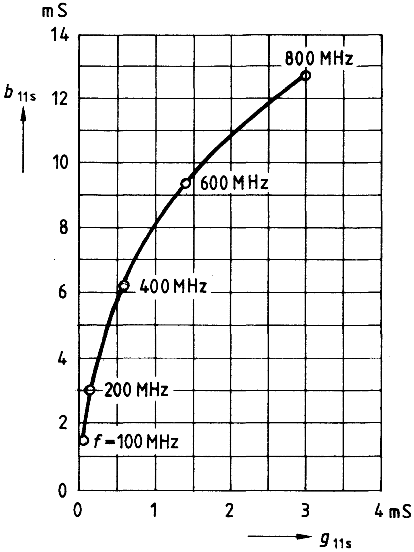
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



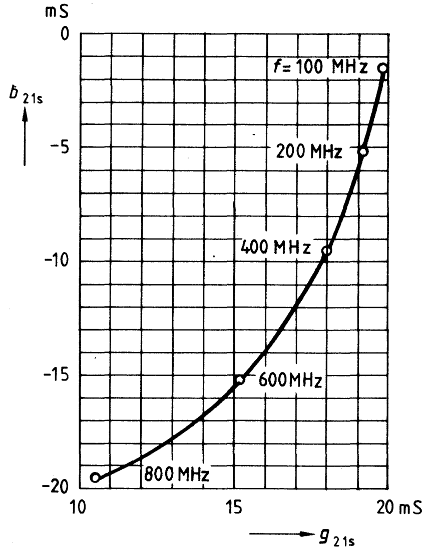
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



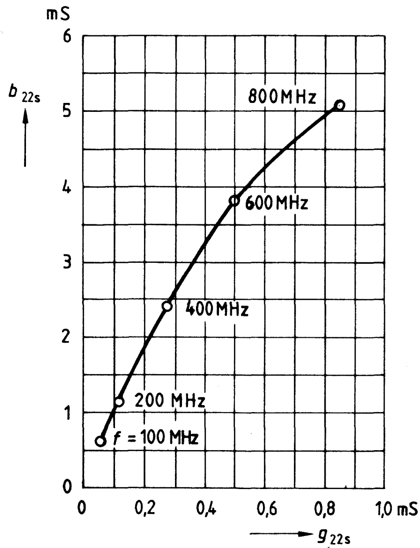
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V, V_{G1S} = 0 V
I_{DSS} = 10 mA (common source)



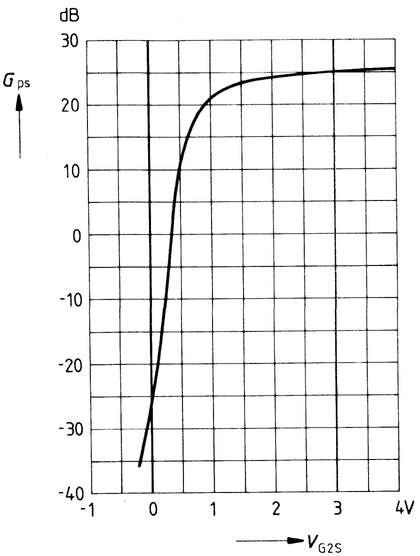
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V, V_{G1S} = 0 V
I_{DSS} = 10 mA (common source)



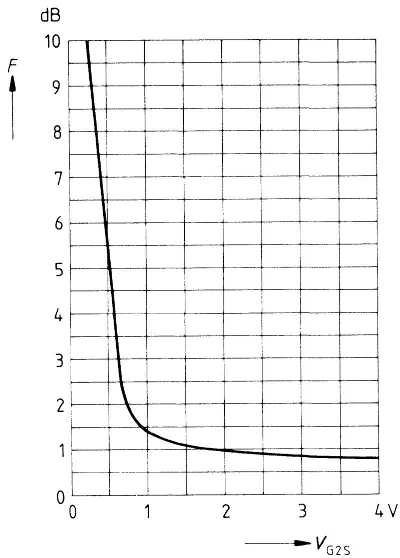
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V, V_{G1S} = 0 V
I_{DSS} = 10 mA (common source)



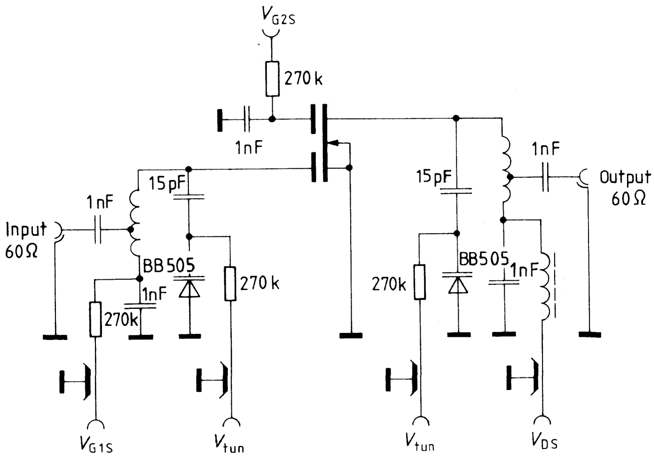
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit)



Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit)

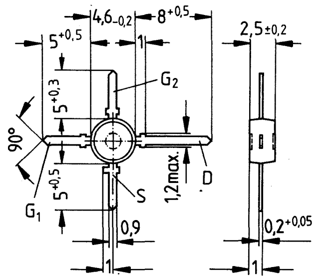


Test circuit for power gain and noise figure
$f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS



- For input stages in UHF TV tuners
- High transconductance
- Low noise figure

X-plast



Dimensions in mm

Type	BF 966 S
Ordering code	Q62702-F438

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	$-55 ... +150$	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

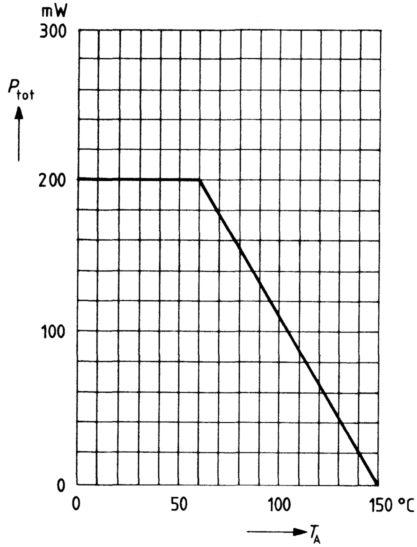
Junction — ambient	R_{thJA}	≤ 450	K/W

Characteristics ($T_A = 25\,°C$)

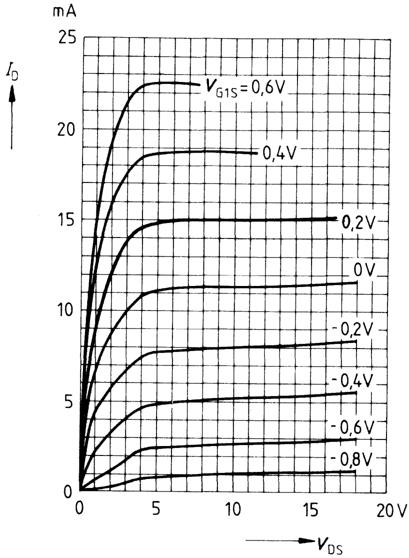
DC characteristics		min	typ	max	
Drain-source breakdown voltage $I_D = 10\,\mu A,\ -V_{G1S} = -V_{G2S} = 4\,V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\,mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\,mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\,V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\,V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\,V,\ V_{G1S} = 0,\ V_{G2S} = 4\,V$	I_{DSS}	2	–	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\,V,\ V_{G2S} = 4\,V,\ I_D = 20\,\mu A$	$-V_{G1S\,(p)}$	–	–	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\,V,\ V_{G1S} = 0,\ I_D = 20\,\mu A$	$-V_{G2S\,(p)}$	–	–	2	V

AC characteristics					
Forward transconductance $V_{DS} = 15\,V,\ I_D = 10\,mA,\ V_{G2S} = 4\,V,\ f = 1\,kHz$	g_{fs}	15	18	–	mS
Gate 1 input capacitance $V_{DS} = 15\,V,\ I_D = 10\,mA,\ V_{G2S} = 4\,V,\ f = 1\,MHz$	c_{g1ss}	–	2,3	–	pF
Gate 2 input capacitance $V_{DS} = 15\,V,\ I_D = 10\,mA,\ V_{G2S} = 4\,V,\ f = 1\,MHz$	c_{g2ss}	–	1,1	–	pF
Feedback capacitance $V_{DS} = 15\,V,\ I_D = 10\,mA,\ V_{G2S} = 4\,V,\ f = 1\,MHz$	c_{dg1}	–	25	–	fF
Output capacitance $V_{DS} = 15\,V,\ I_D = 10\,mA,\ V_{G2S} = 4\,V,\ f = 1\,MHz$	c_{dss}	–	0,8	–	pF
Power gain $V_{DS} = 15\,V,\ I_D = 10\,mA$	G_{ps}				
$f = 200\,MHz,\ G_G = 2\,mS,\ G_L = 0{,}5\,mS$ (test circuit 1)		–	25	–	dB
$f = 800\,MHz,\ G_G = 3{,}3\,mS,\ G_L = 1\,mS$ (test circuit 2)		–	18	–	dB
Noise figure $V_{DS} = 15\,V,\ I_D = 10\,mA$	F				
$f = 200\,MHz,\ G_G = 2\,mS,\ G_L = 0{,}5\,mS$ (test circuit 1)		–	1	–	dB
$f = 800\,MHz,\ G_G = 3{,}3\,mS,\ G_L = 1\,mS$ (test circuit 2)		–	1,8	–	dB
Gain control range $V_{DS} = 15\,V,\ V_{G2S} = 4 \ldots -2\,V,\ f = 800\,MHz$ (test circuit 2)	ΔG_{ps}	40	–	–	dB

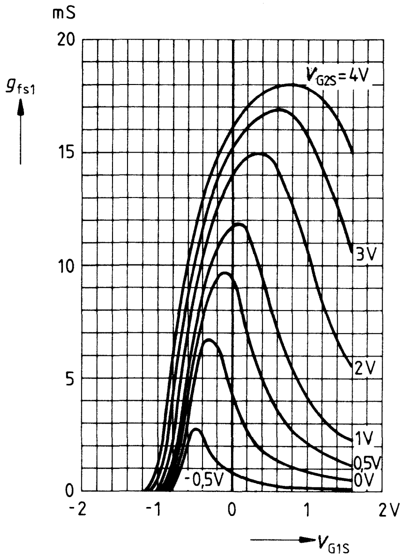
Total power dissipation $P_{tot} = f(T_A)$



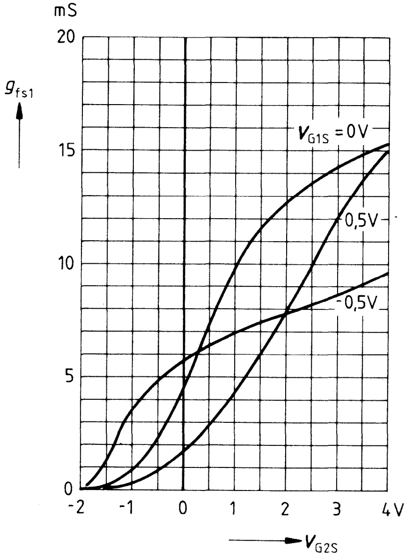
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



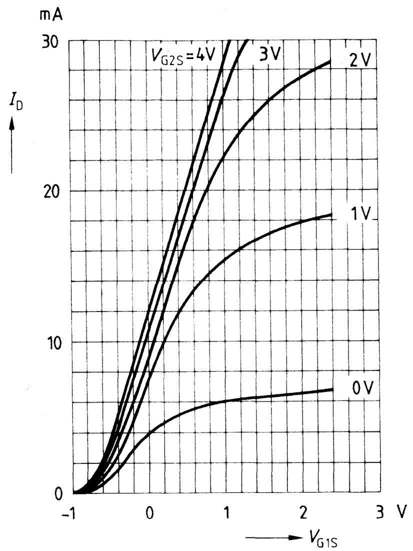
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHZ



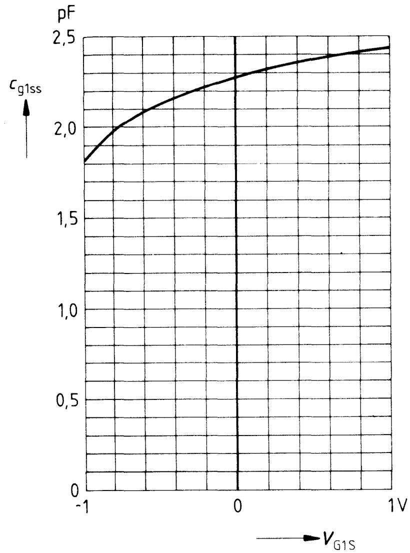
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



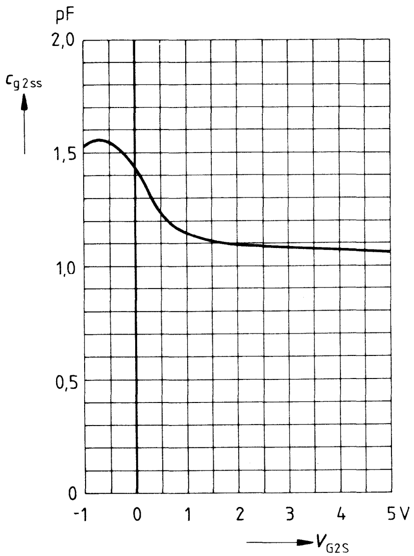
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



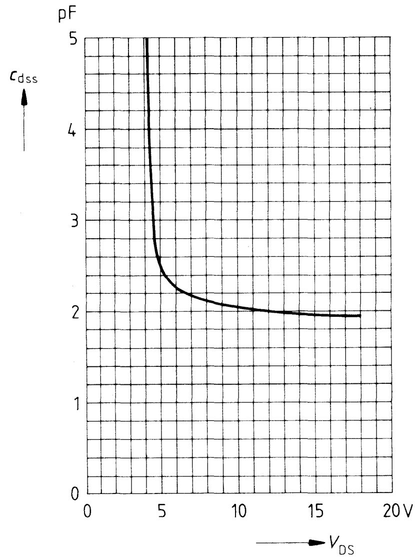
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



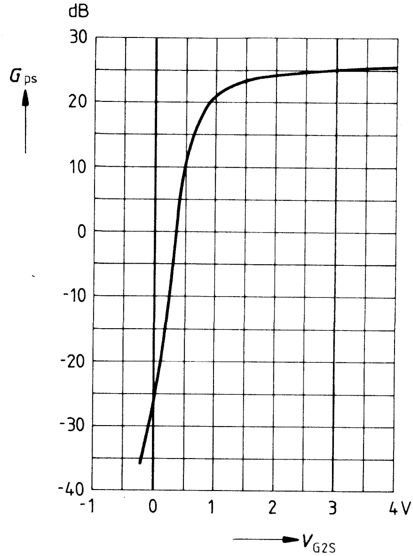
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



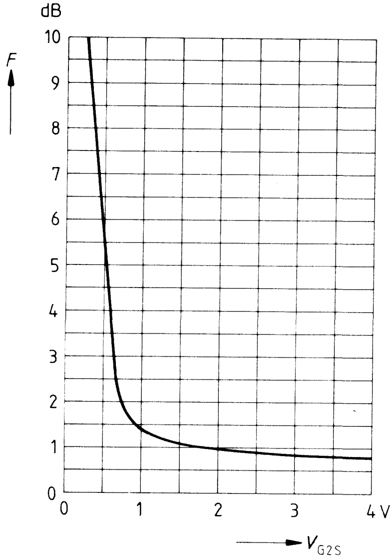
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



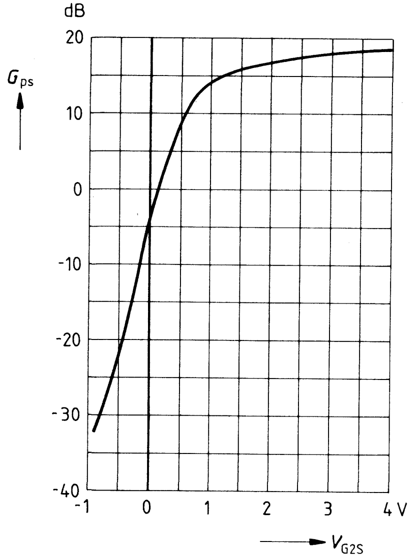
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 200 MHz (see test circuit 1)



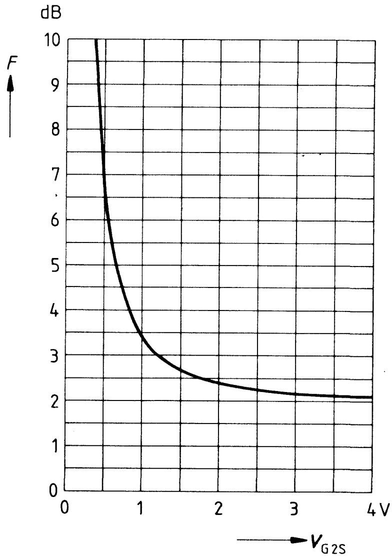
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 200 MHz (see test circuit 1)



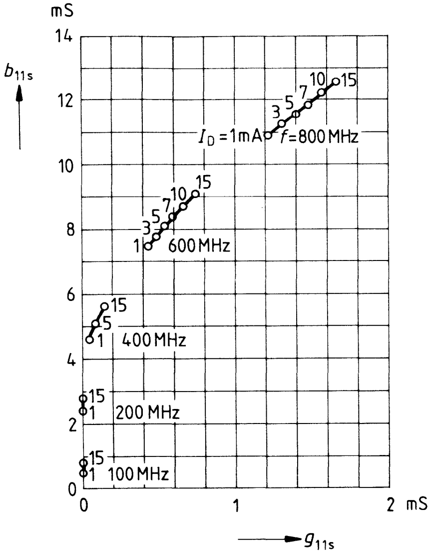
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 800 MHz (see test circuit 2)



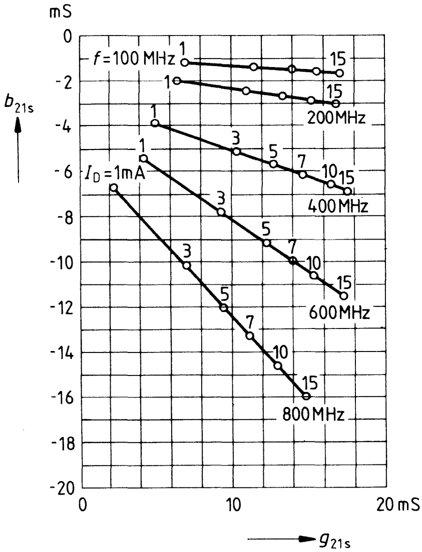
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 800 MHz (see test circuit 2)



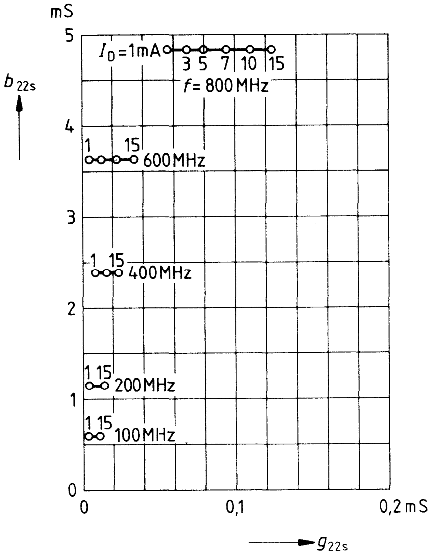
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



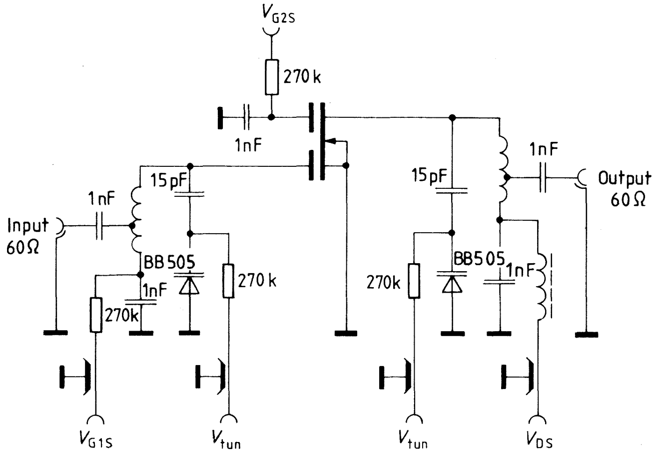
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



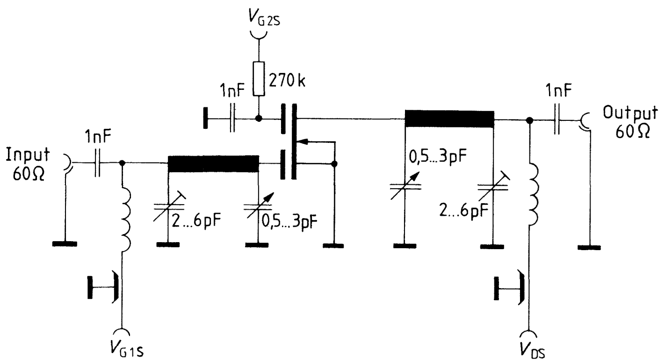
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



Test circuit 1 for power gain and noise figure
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS

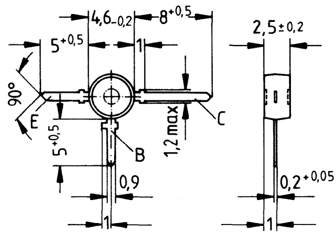


Test circuit 2 for power gain, noise figure and cross modulation
f = 800 MHz, G_G = 3,3 mS, G_L = 1,0 mS



- For UHF mixer and oscillator stages

T-plast



Dimensions in mm

Type	BF 970
Ordering code	Q62702-F611

Maximum ratings

Collector-emitter voltage	V_{CEO}	35	V
Collector-base voltage	V_{CBO}	40	V
Emitter-base voltage	V_{EBO}	3	V
Collector current	I_C	30	mA
Base current	I_B	5	mA
Total power dissipation ($T_A \leq 50\,°C$)	P_{tot}	160	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−50...+150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤600	K/W

Characteristics (T_A = 25 °C)

DC characteristics		**min**	**typ**	**max**	
Collector cutoff current V_{CB} = 20 V	I_{CBO}	—	—	100	nA
DC current gain I_C = 3 mA, V_{CE} = 10 V	h_{FE}	25	50	—	—

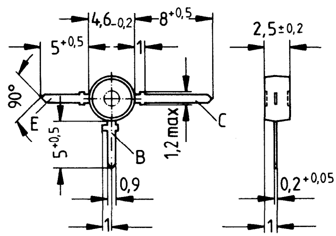
AC characteristics					
Transition frequency I_C = 3 mA, V_{CE} = 10 V, f = 100 MHz	f_T	—	950	—	MHz
Output capacitance V_{CB} = 10 V, I_E = 0, f = 1 MHz	C_{obo}	—	0,45	—	pF
Collector-emitter capacitance V_{CB} = 1 V, V_{BE} = 0, f = 1 MHz	C_{ce}	—	0,1	—	pF
Noise figure I_C = 3 mA, V_{CB} = 10 V, f = 800 MHz R_S = 60 Ω	F	—	4,5	—	dB
Common base power gain I_C = 3 mA, V_{CB} = 10 V, f = 800 MHz R_L = 500 Ω	G_{pb}		14,8	—	dB
Collector current for G_{pbmax} V_{CC} = 12 V, R_{CC} = 1 kΩ, f = 800 MHz R_L = 500 Ω	I_{CGmax}	—	4,5	—	mA

PNP Silicon RF Transistor

BF 979 S

- For low-distortion, low-noise UHF input stages and UHF oscillators

T-plast



Dimensions in mm

Type	BF 979 S
Ordering code	Q62702-F610

Maximum ratings

Collector-emitter voltage	V_{CEO}	25	V
Collector-base voltage	V_{CBO}	30	V
Emitter-base voltage	V_{EBO}	3	V
Peak collector current	I_{CM}	50	mA
Total power dissipation ($T_A \leq$ 50 °C)	P_{tot}	160	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−50... +150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤600	K/W

Characteristics (T_A = 25 °C)

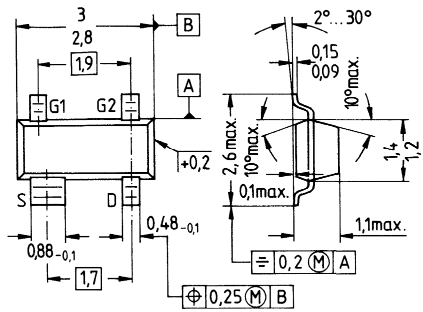
DC characteristics		min	typ	max	
Collector cutoff current V_{CB} = 20 V	I_{CBO}	–	–	100	nA
DC current gain I_C = 10 mA, V_{CE} = 10 V	h_{FE}	20	–	–	–

AC characteristics					
Transition frequency I_C = 10 mA, V_{CE} = 10 V, f = 100 MHz	f_T	–	1,6	–	GHz
Output capacitance V_{CB} = 10 V, f = 1 MHz	c_{obo}	–	0,55	–	pF
Collector-emitter capacitance V_{CB} = 1 V, V_{BE} = 0, f = 1 MHz	c_{ce}	–	0,09	–	pF
Noise figure I_C = 10 mA, V_{CB} = 10 V, R_S = 60 Ω	F				
f = 200 MHz		–	3	–	dB
800 MHz		–	3,5	4,5	dB
Power gain I_C = 10 mA, V_{CB} = 10 V, f = 800 MHz R_L = 500 Ω	G_{pb}		16,5		dB
Interference voltage[1] I_C = 10 mA, V_{CB} = 10 V, f = 200 MHz R_S = 75 Ω	$V_{1\%}$	–	230	–	mV
Collector current for G_{pbmax} V_{CB} = 10 V, f = 800 MHz, R_L = 500 Ω	I_{CGmax}	10	–	–	mA

[1] $V_{1\%}$ is the rms value of half the emf (terminal voltage at matching) of a 100% sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1% amplitude modulation on the active carrier.

- For amplifier and mixer stages in UHF and VHF TV tuners
- Low input and output capacitance
- Miniature plastic package for surface mounting (SMD)

SOT 143



Dimensions in mm

Type	BF 989	
Ordering code	bulk: Q62702-F874	taped: Q62702-F969
Marking	MA	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W

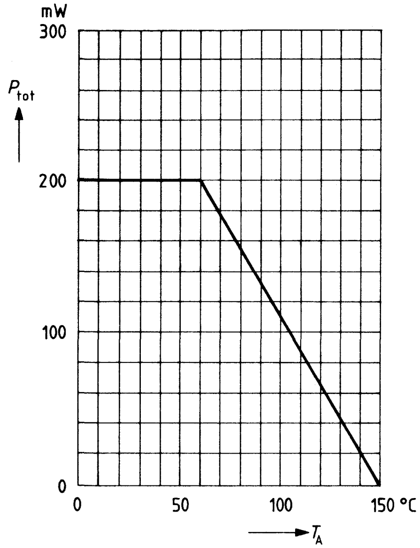
Characteristics ($T_A = 25\,°C$)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\ DS}$	20	—	—	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\ G1SS}$	8,5	—	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\ G2SS}$	8,5	—	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	—	—	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	—	—	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	2	—	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\ (p)}$	—	—	2,7	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\ (p)}$	—	—	2,7	V

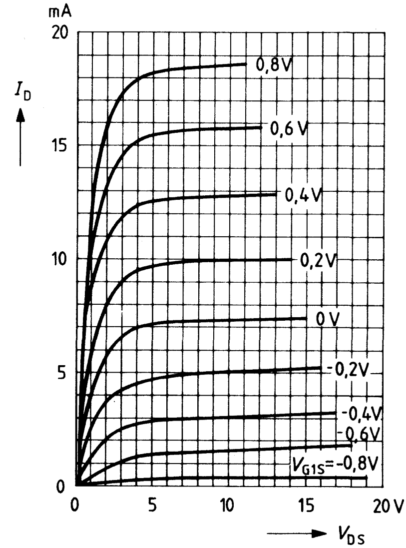
Characteristics ($T_A = 25\,°C$)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance $V_{DS} = 15$ V, $I_D = 7$ mA, $V_{G2S} = 4$ V, $f = 1$ kHz	g_{fs}	9,5	12	–	mS
Gate 1 input capacitance $V_{DS} = 15$ V, $I_D = 7$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{g1ss}	–	1,8	–	pF
Gate 2 input capacitance $V_{DS} = 15$ V, $I_D = 7$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{g2ss}	–	1	–	pF
Feedback capacitance $V_{DS} = 15$ V, $I_D = 7$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{dg1}	–	25	–	fF
Output capacitance $V_{DS} = 15$ V, $I_D = 7$ mA, $V_{G2S} = 4$ V, $f = 1$ MHz	c_{dss}	–	0,8	–	pF
Power gain $V_{DS} = 15$ V, $I_D = 7$ mA	G_{ps}				
$f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS (test circuit 1)		–	23	–	dB
$f = 800$ MHz, $G_G = 2{,}5$ mS, $G_L = 0{,}8$ mS (test circuit 2)		–	16,5	–	dB
Noise figure $V_{DS} = 15$ V, $I_D = 7$ mA	F				
$f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS (test circuit 1)		–	1,6	–	dB
$f = 800$ MHz, $G_G = 2{,}5$ mS, $G_L = 0{,}8$ mS (test circuit 2)		–	2,8	–	dB
Gain control range $V_{DS} = 15$ V, $V_{G2S} = 4 \ldots -2$ V, $f = 800$ MHz	ΔG_{ps}	40	–	–	dB
Mixer gain $V_{DS} = 15$ V, $V_{G2S} = 4$ V, $f = 800$ MHz $f_{IF} = 36$ MHz, $2\,\Delta f_{IF} = 5$ MHz $V_{osc} = 800$ mV (test circuit 3)	G_{psc}	–	16	–	dB

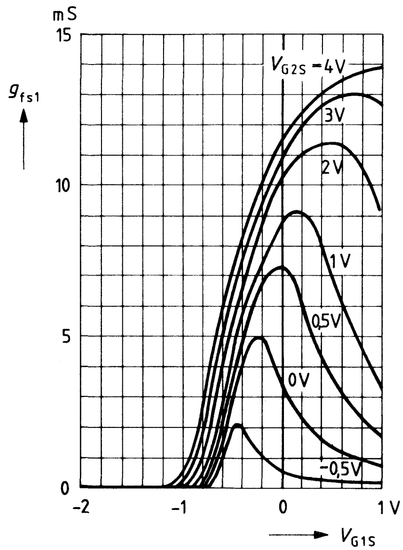
Total power dissipation $P_{tot} = f(T_A)$



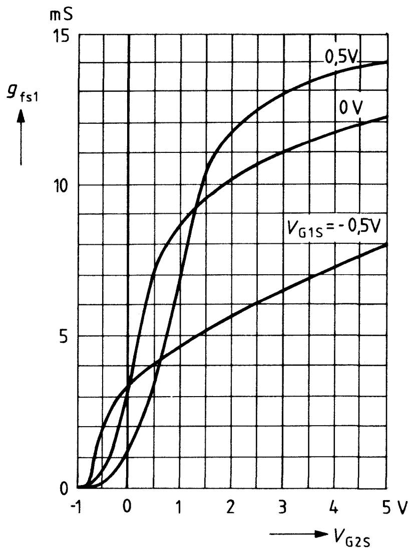
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



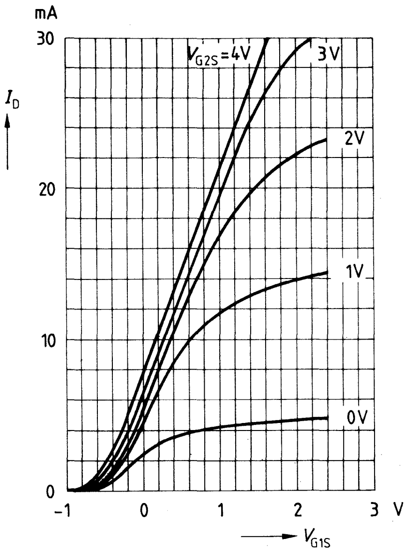
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ kHz



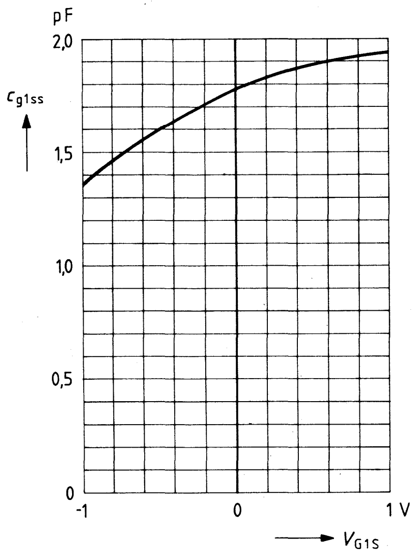
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ kHz



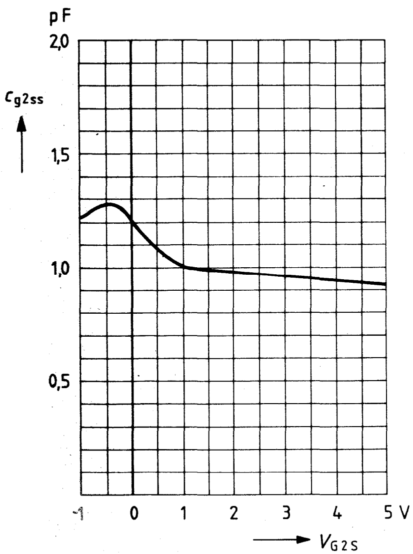
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



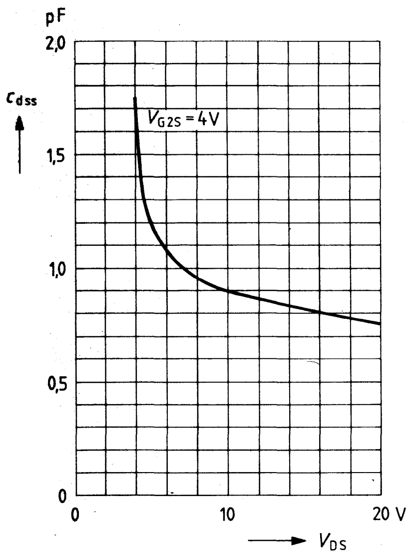
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



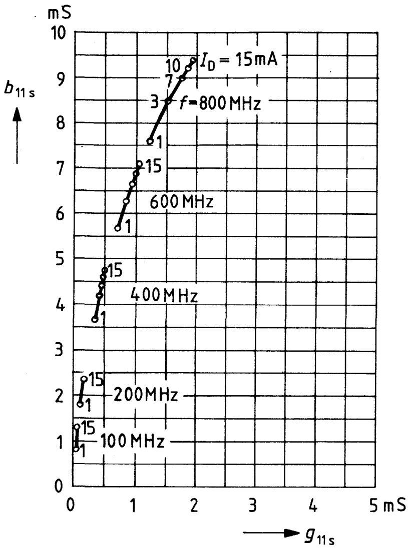
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



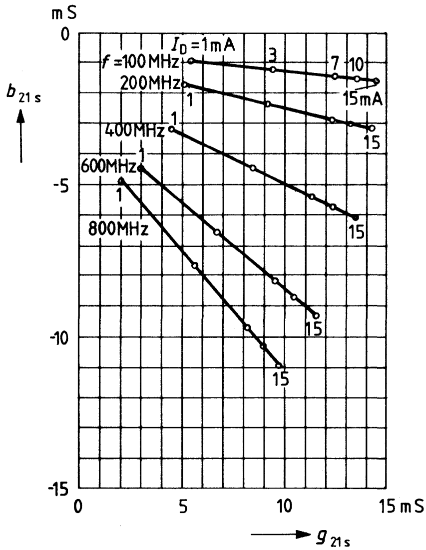
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 7$ mA, $f = 1$ MHz



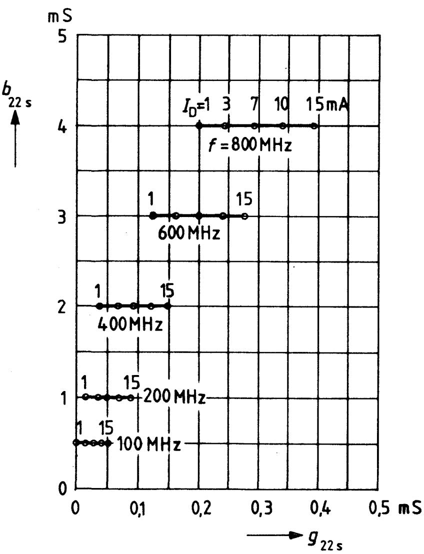
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



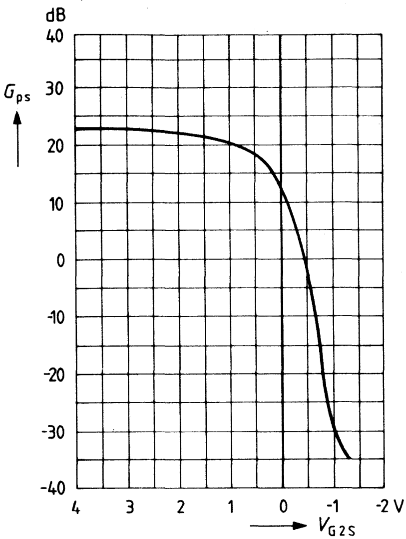
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



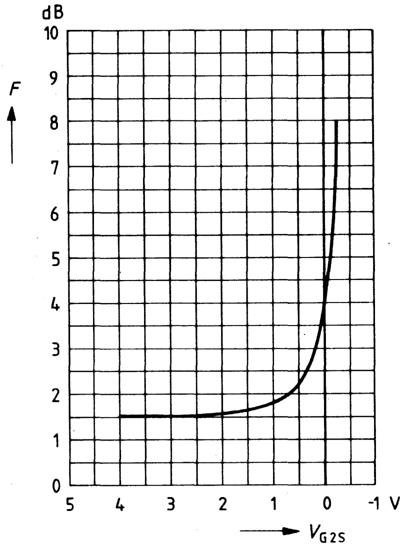
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



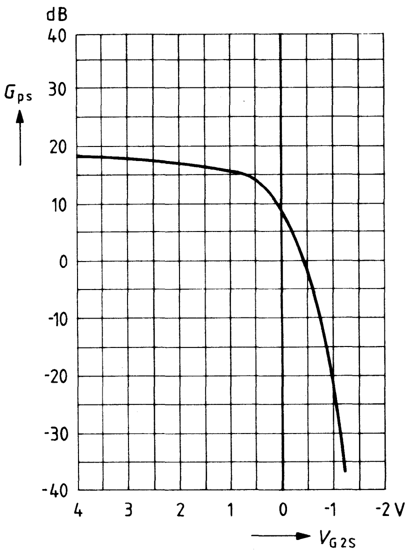
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 7 mA
f = 200 MHz (see test circuit 1)



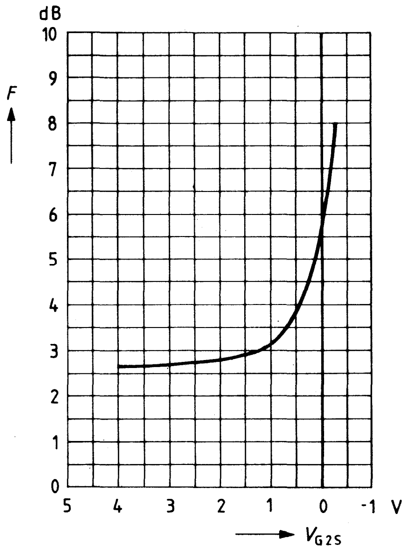
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 7 mA
f = 200 MHz (see test circuit 1)



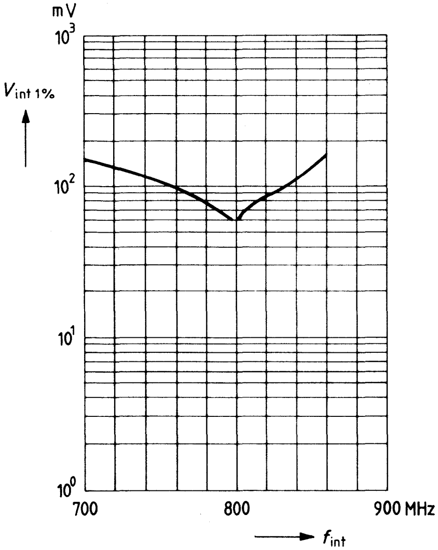
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 7 mA
f = 800 MHz, R_S = 0 (see test circuit 2)



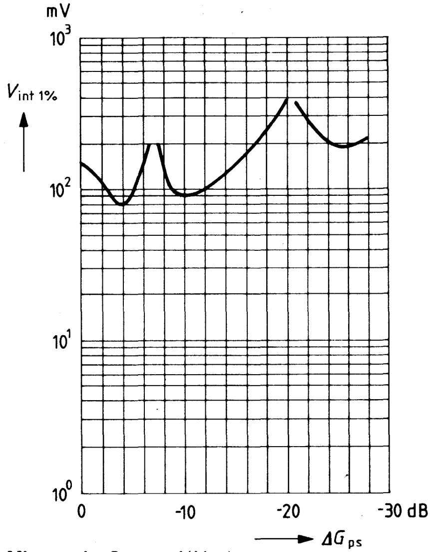
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 7 mA
f = 800 MHz, R_S = 0 (see test circuit 2)



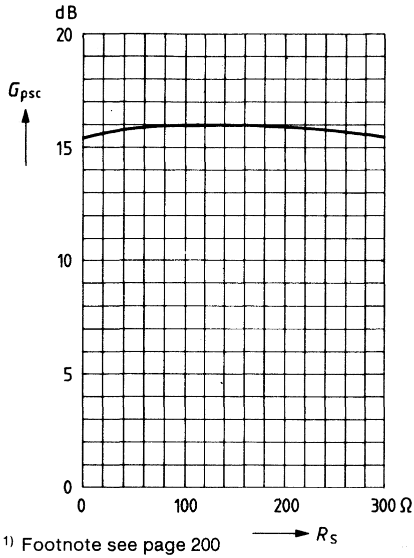
Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(f_{int})$ [1)]
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $V_{G1S} = 1$ V
$f = 800$ MHz (see test circuit 2)



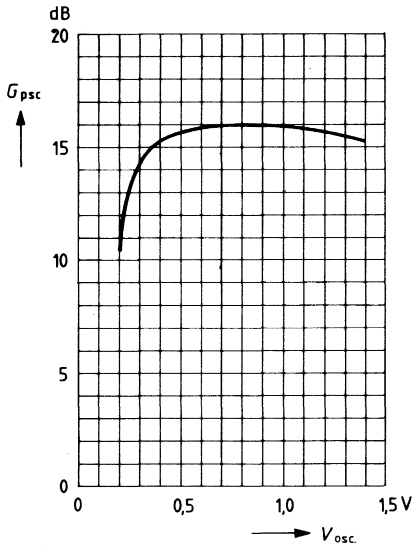
Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(\Delta G_{ps})$ [1)]
$V_{DS} = 15$ V, $V_{G1S} = 1$ V, $f = 800$ MHz
$f_{int} = 700$ MHz (see test circuit 2)



Mixer gain $G_{psc} = f(R_S)$
$f = 800$ MHz, $f_{osc} = 836$ MHz, $V_{osc} = 800$ mV
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $I_{DSS} = 7$ mA
(see test circuit 3)

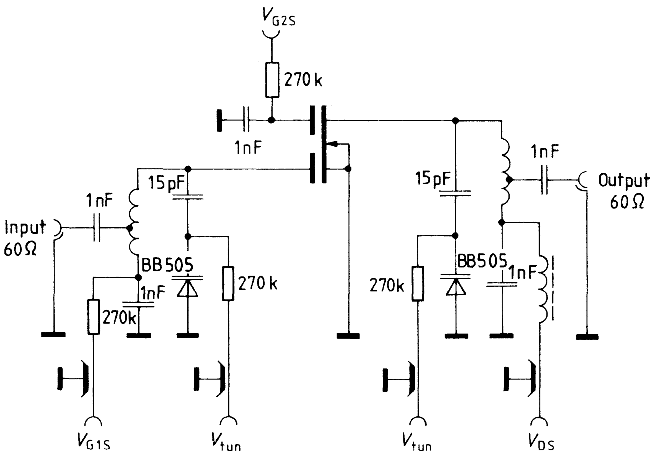


Mixer gain $G_{psc} = f(V_{osc})$
$f = 800$ MHz, $f_{osc} = 836$ MHz, $R_S = 150\ \Omega$
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $I_{DSS} = 7$ mA
(see test circuit 3)

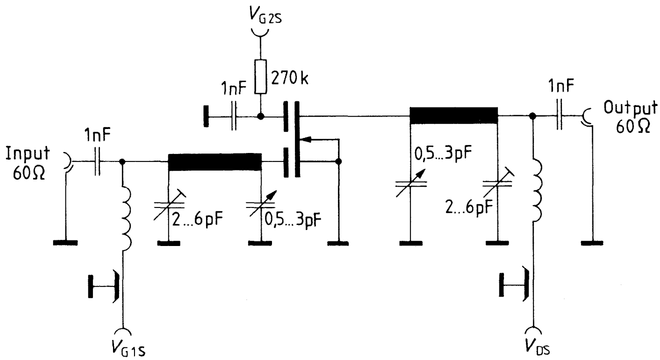


1) Footnote see page 200

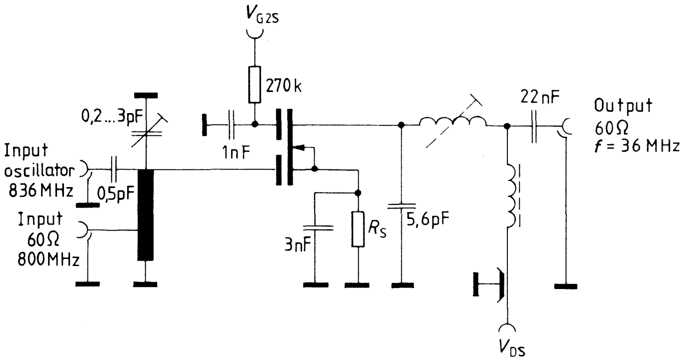
Test circuit 1 for power gain and noise figure
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



Test circuit 2 for power gain, noise figure and cross modulation
f = 800 MHz, G_G = 2,5 mS, G_L = 0,8 mS



Test circuit 3 for mixer gain
f = 800/36 MHz



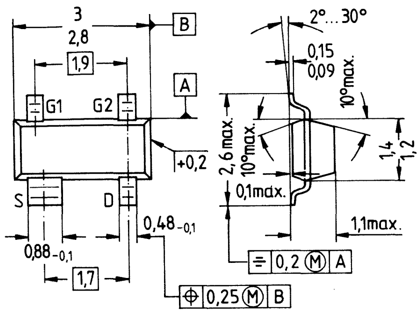
[1] $V_{int\ (1\%)}$ is the rms value of half the emf (terminal voltage at matching) of a 100% sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1% amplitude modulation on the active carrier.

Silicon N Channel MOSFET Tetrode

BF 993

- For high-gain, low-distortion VHF TV and FM mixer and input stages
- Miniature plastic package for surface mounting (SMD)

SOT 143



Dimensions in mm

Type	BF 993	
Ordering code	bulk: Q62702-F899	taped: Q62702-F1018
Marking	ME	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	50	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤450	K/W[1]

[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

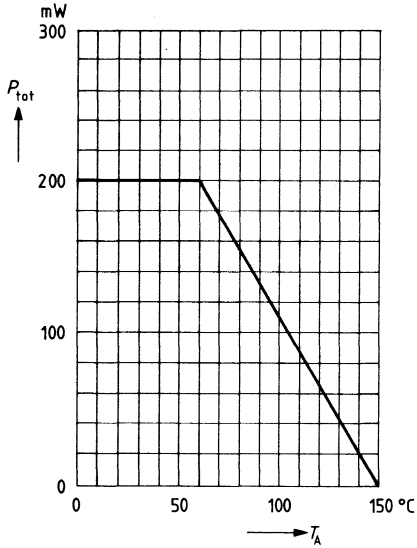
Characteristics ($T_A = 25\,°C$)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	6	–	40	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\,(p)}$	–	–	3,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\,(p)}$	–	–	3,0	V

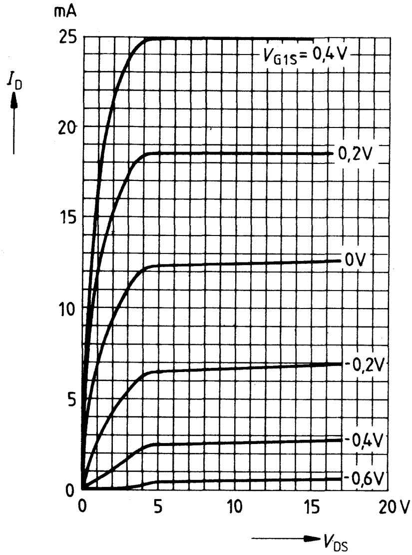
Characteristics ($T_A = 25\,°C$)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,kHz$	g_{fs}	16	25	–	mS
Gate 1 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{g1ss}	–	6	–	pF
Gate 2 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{g2ss}	–	2,5	–	pF
Feedback capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{dg1}	–	50	–	fF
Output capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{dss}	–	2,5	–	pF
Power gain $V_{DS} = 15\,V$, $I_D = 10\,mA$ $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ $2\Delta f = 12\,MHz$ (test circuit)	G_{ps}	–	25	–	dB
Noise figure $V_{DS} = 15\,V$, $I_D = 10\,mA$ $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit)	F	–	1,5	–	dB

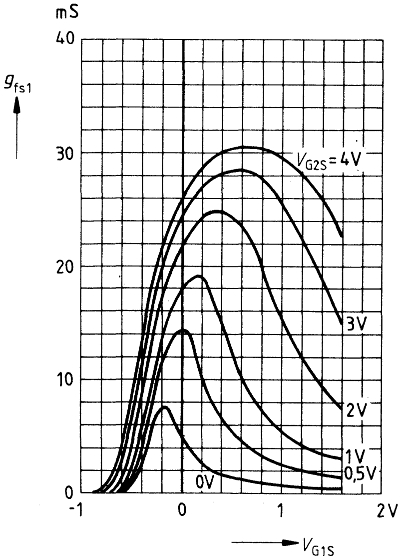
Total power dissipation $P_{tot} = f(T_A)$



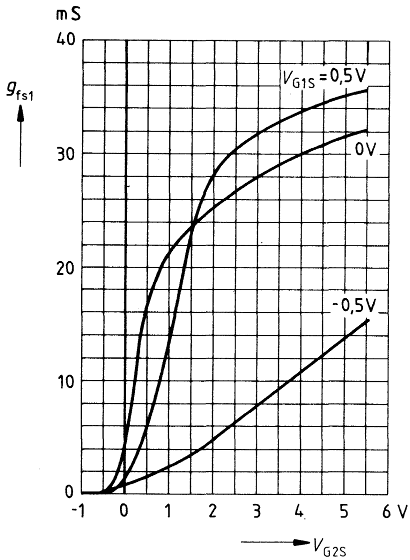
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



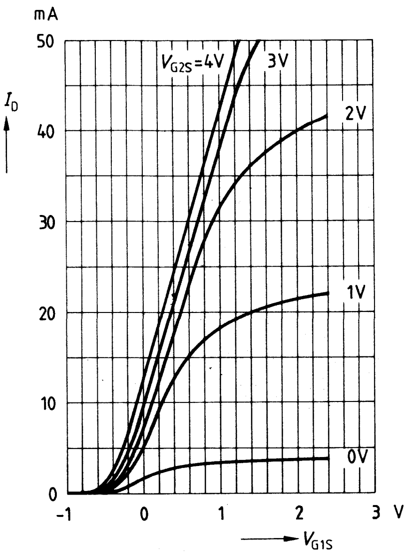
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



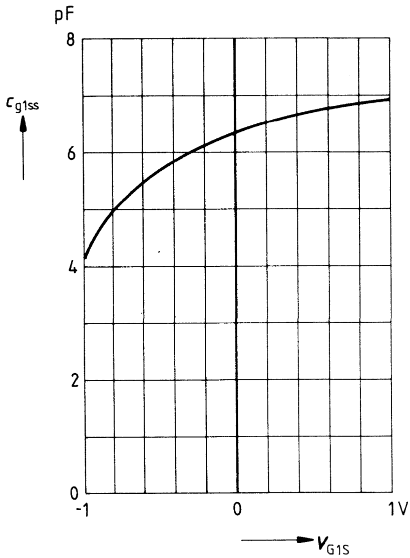
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



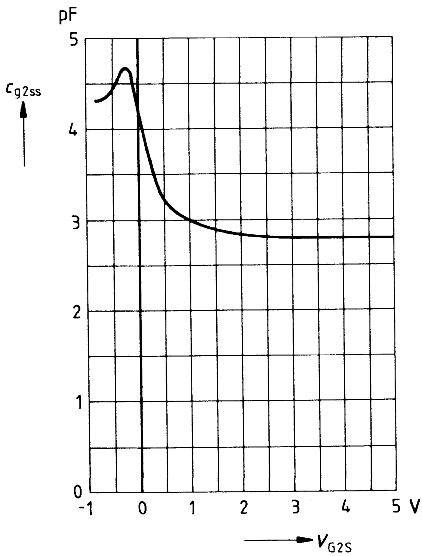
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



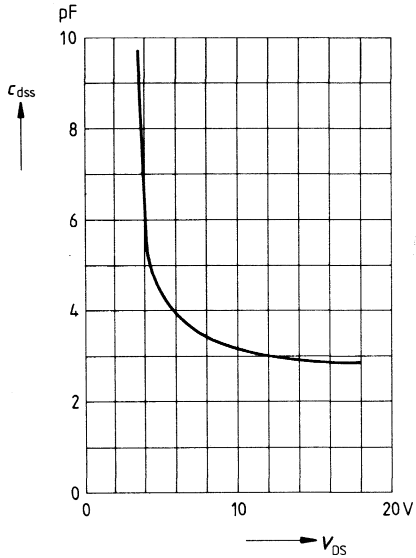
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



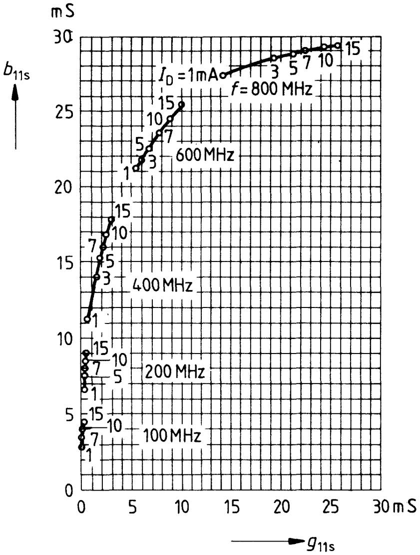
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



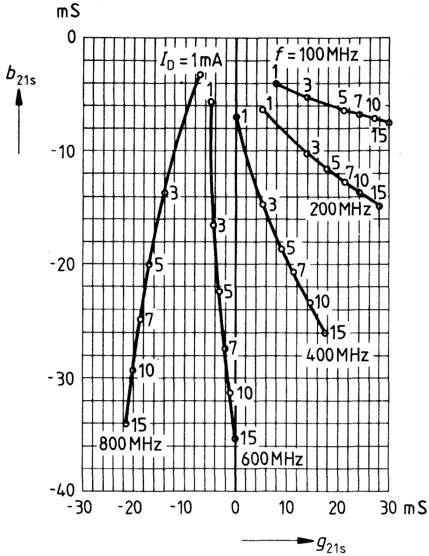
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



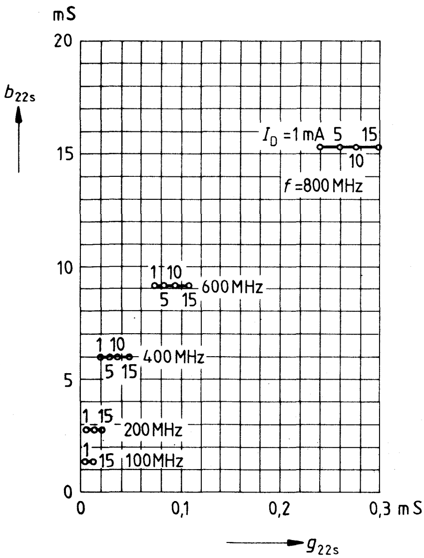
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



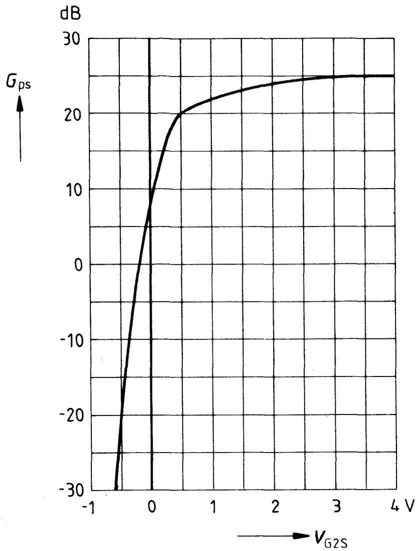
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



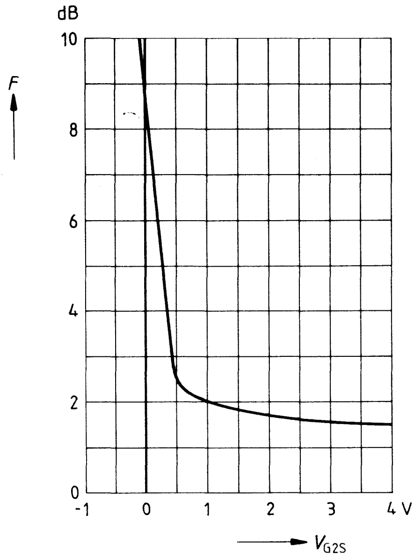
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



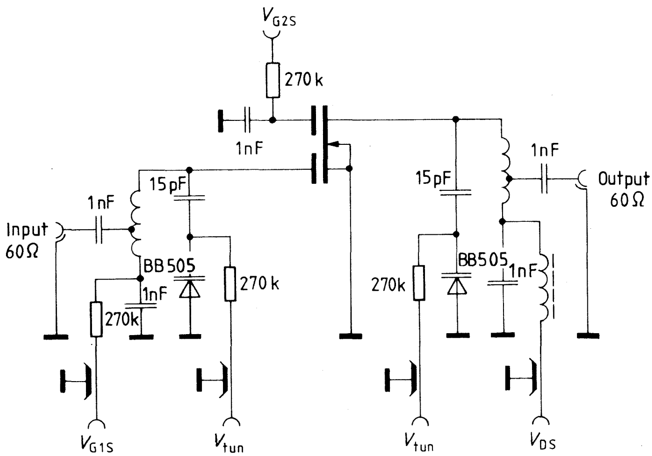
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit)



Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit)



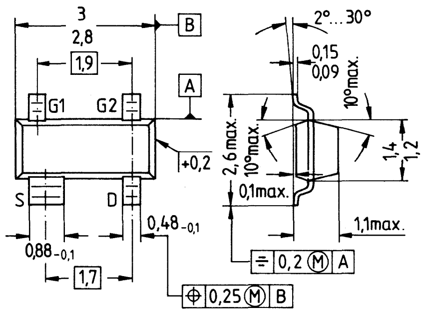
Test circuit for power gain and noise figure
$f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS



Silicon N Channel MOSFET Tetrode — BF 994 S

- For VHF applications, especially for input and mixer stages with a wide tuning range, e. g. in CATV tuners
- Miniature plastic package for surface mounting (SMD)

SOT 143



Dimensions in mm

Type	BF 994 S	
Ordering code	bulk: Q62702-F963	taped: Q62702-F1020
Marking	MG	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	–55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤450	K/W[1]

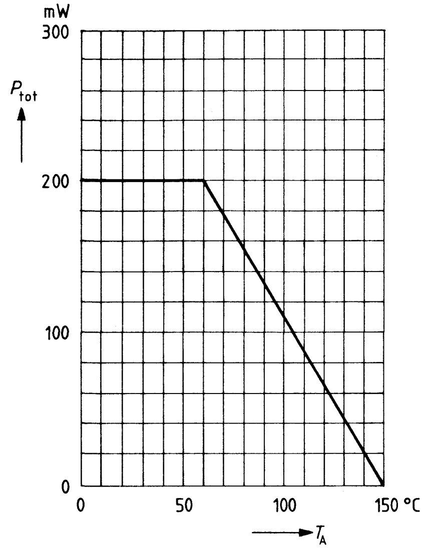
[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

Characteristics ($T_A = 25\,°C$)

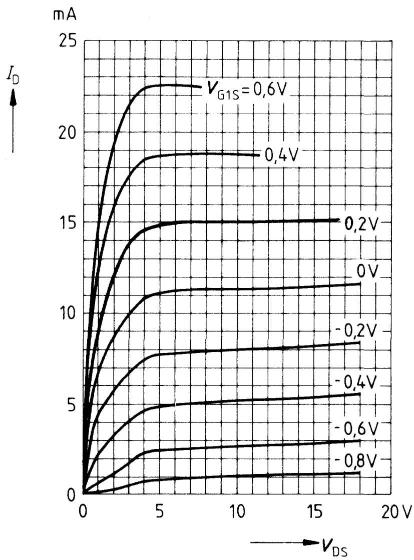
DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\ DS}$	20	—	—	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\ G1SS}$	8,5	—	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\ G2SS}$	8,5	—	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	—	—	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	—	—	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	2	—	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\ (p)}$	—	—	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\ (p)}$	—	—	2,0	V

AC characteristics					
Forward transconductance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ kHz$	g_{fs}	15	18	—	mS
Gate 1 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g1ss}	—	2,5	—	pF
Gate 2 input capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{g2ss}	—	1,2	—	pF
Feedback capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dg1}	—	25	—	fF
Output capacitance $V_{DS} = 15\ V,\ I_D = 10\ mA,\ V_{G2S} = 4\ V,\ f = 1\ MHz$	c_{dss}	—	1	—	pF
Power gain $V_{DS} = 15\ V,\ I_D = 10\ mA$ $f = 200\ MHz,\ G_G = 2\ mS,\ G_L = 0{,}5\ mS$ (test circuit)	G_{ps}	—	25	—	dB
Noise figure $V_{DS} = 15\ V,\ I_D = 10\ mA$ $f = 200\ MHz,\ G_G = 2\ mS,\ G_L = 0{,}5\ mS$ (test circuit)	F	—	1	—	dB
Gain control range $V_{DS} = 15\ V,\ V_{G2S} = 4 \ldots -2\ V,\ f = 200\ MHz$ (test circuit)	ΔG_{ps}	50	—	—	dB

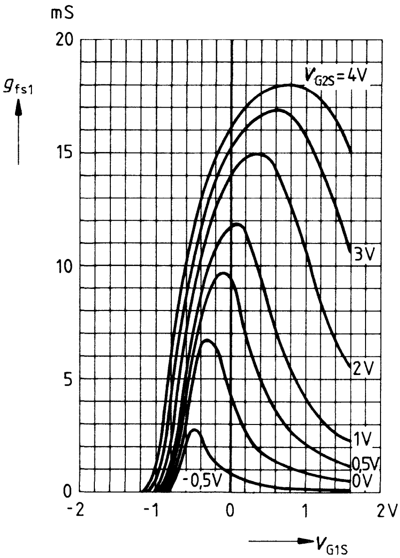
Total power dissipation $P_{tot} = f(T_A)$



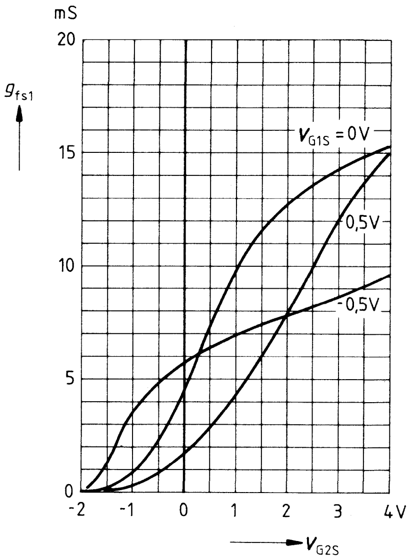
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



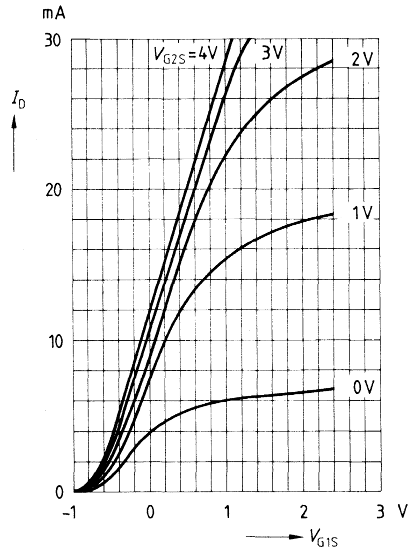
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



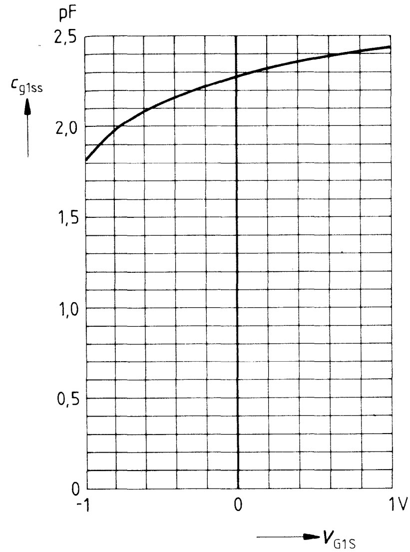
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ kHz



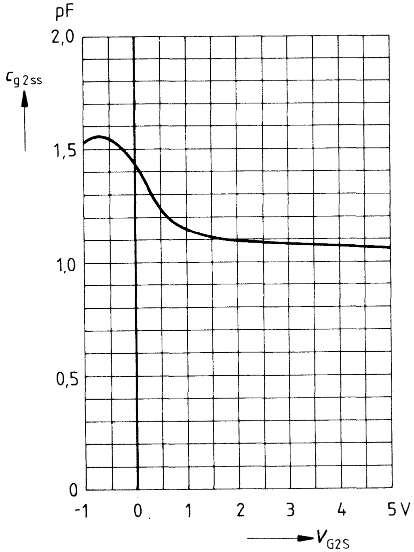
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



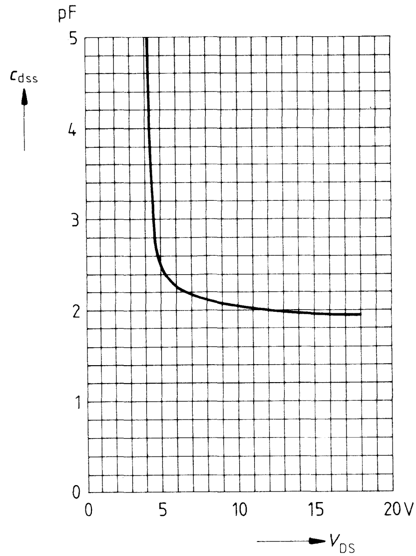
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



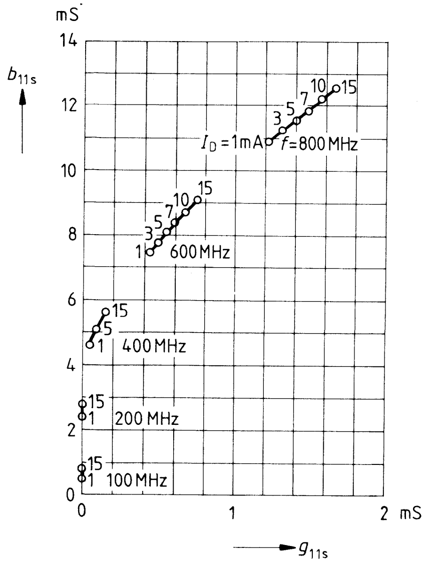
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



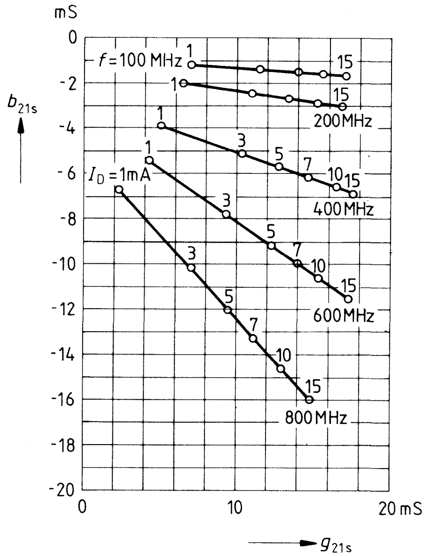
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



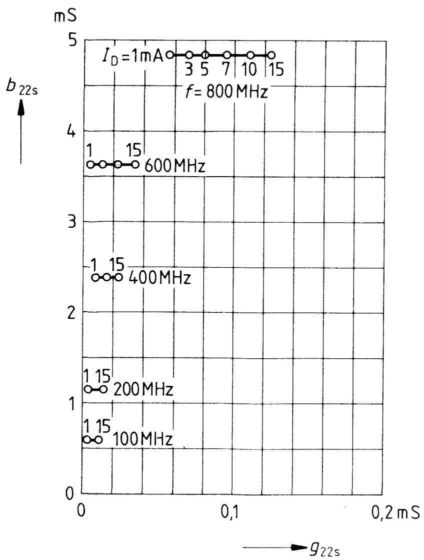
Gate 1 input admittance y_{11s}
V_{DS} = 15 V; V_{G2S} = 4 V
(common source)



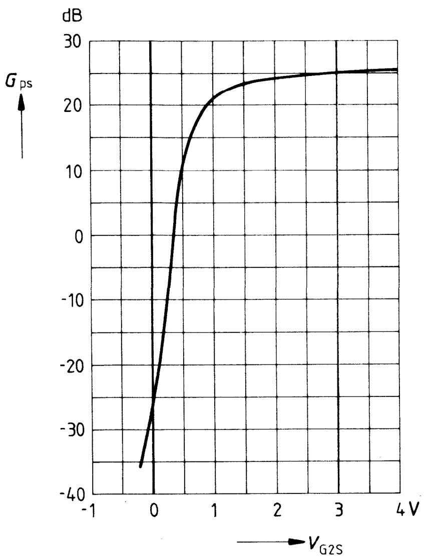
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



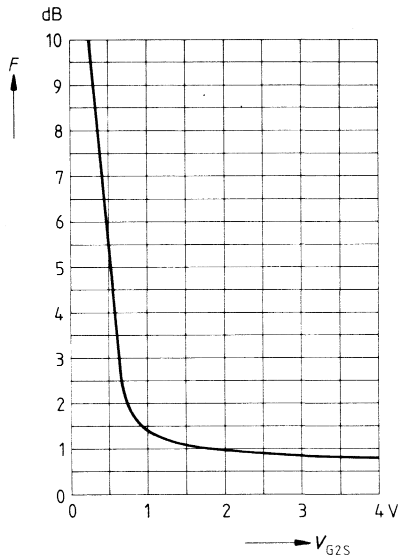
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



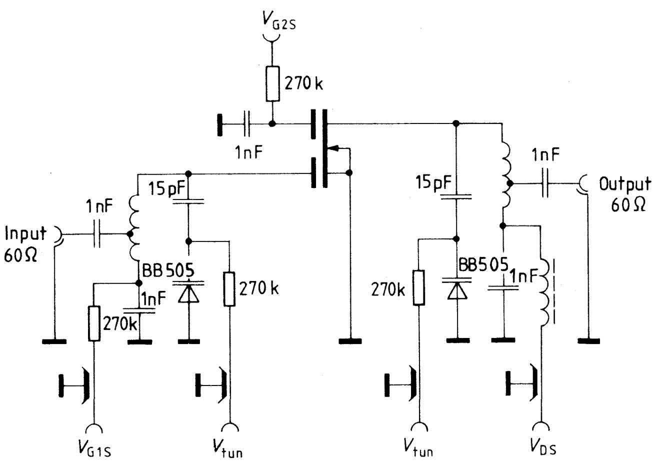
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V
$I_{DSS} = 10$ mA, $f = 200$ MHz
(see test circuit)



Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V
$I_{DSS} = 10$ mA, $f = 200$ MHz
(see test circuit)



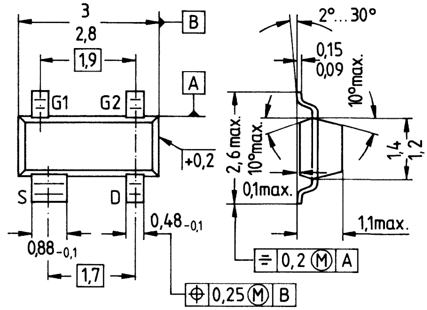
Test circuit for power gain and noise figure
$f = 200$ MHz, $G_G = 2$ mS, $G_L = 0{,}5$ mS



Silicon N Channel MOSFET Tetrode — BF 995

- For input and mixer stages in FM and VHF TV tuners
- Miniature plastic package for surface mounting (SMD)

SOT 143



Dimensions in mm

Type	BF 995	
Ordering code	bulk: Q62702-F872	taped: Q62702-F936
Marking	MB	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	$-55 ... +150$	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction — ambient	R_{thJA}	≤ 450	K/W[1]

[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

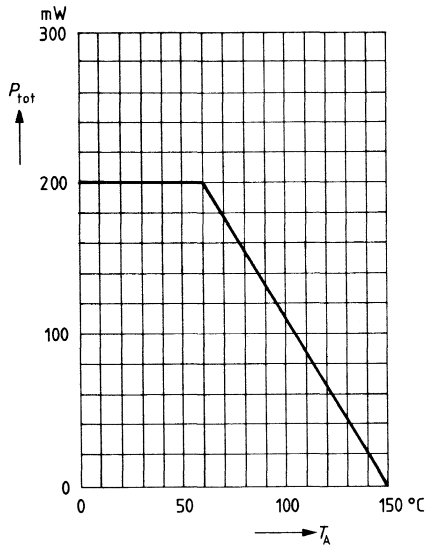
Characteristics (T_A = 25 °C)

DC characteristics		min	typ	max	
Drain-source breakdown voltage I_D = 10 µA, $-V_{G1S}$ = $-V_{G2S}$ = 4 V	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S}$ = 10 mA, V_{G2S} = V_{DS} = 0	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S}$ = 10 mA, V_{G1S} = V_{DS} = 0	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S}$ = 5 V, V_{G2S} = V_{DS} = 0	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S}$ = 5 V, V_{G1S} = V_{DS} = 0	$\pm I_{G2SS}$	–	–	50	nA
Drain current V_{DS} = 15 V, V_{G1S} = 0, V_{G2S} = 4 V	I_{DSS}	4	–	20	mA
Gate 1 source pinch-off voltage V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 20 µA	$-V_{G1S\,(p)}$	–	–	3,5	V
Gate 2 source pinch-off voltage V_{DS} = 15 V, V_{G1S} = 0, I_D = 20 µA	$-V_{G2S\,(p)}$	–	–	3,5	V

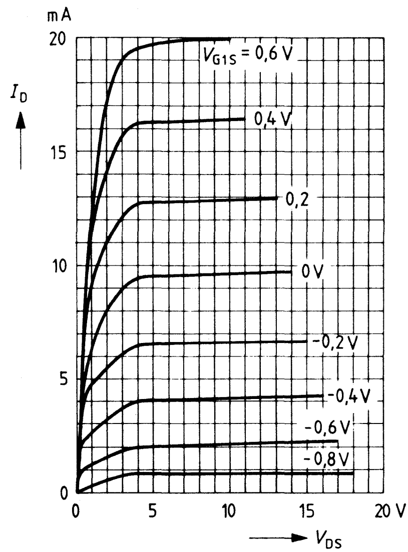
Characteristics (T_A = 25 °C)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance V_{DS} = 15 V, I_D = 10 mA, V_{G2S}=4 V, f=1 kHz	g_{fs}	12	17	–	mS
Gate 1 input capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S}=4 V, f=1 MHz	c_{g1ss}	–	3,6	–	pF
Gate 2 input capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S}=4 V, f=1 MHz	c_{g2ss}	–	1,6	–	pF
Feedback capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S}=4 V, f=1 MHz	c_{dg1}	–	25	–	fF
Output capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S}=4 V, f=1 MHz	c_{dss}	–	1,6	–	pF
Power gain V_{DS} = 15 V, I_D = 10 mA f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS $2\Delta f$= 12 MHz (see test circuit 1)	G_{ps}	–	23	–	dB
Noise figure V_{DS} = 15 V, I_D = 10 mA f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS (see test circuit 1)	F	–	1,1	–	dB
Gain control range V_{DS} = 15 V, V_{G2S} = 4 ... –2 V, f = 200 MHz (see test circuit 1)	ΔG_{ps}	–	50	–	dB
Mixer gain (additive) V_{DS} = 15 V, V_{G2S} = 6 V, R_S = 220 Ω f = 200 MHz, f_{IF} = 36 MHz $2\Delta f_{IF}$ = 5 MHz, V_{osc} = 0,5 V (see test circuit 2)	G_{psc}	–	16	–	dB
Mixer gain (multiplicative) V_{DS} = 15 V, V_{G1S} = 1,7 V, V_{G2S} = 2,5 V R_S = 220 Ω, f = 200 MHz, f_{IF} = 36 MHz $2\Delta f_{IF}$ = 5 MHz, V_{osc} = 2 V (see test circuit 3)	G_{psc}	–	18	–	dB

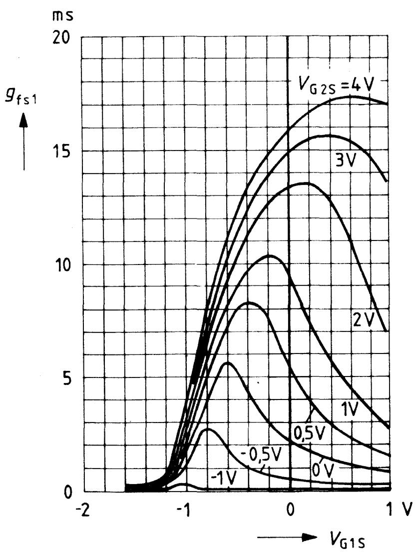
Total power dissipation $P_{tot} = f(T_A)$



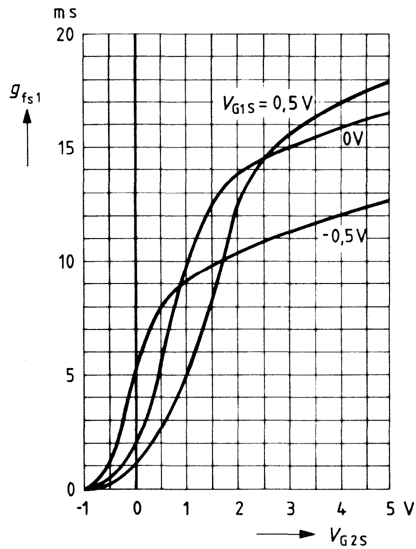
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



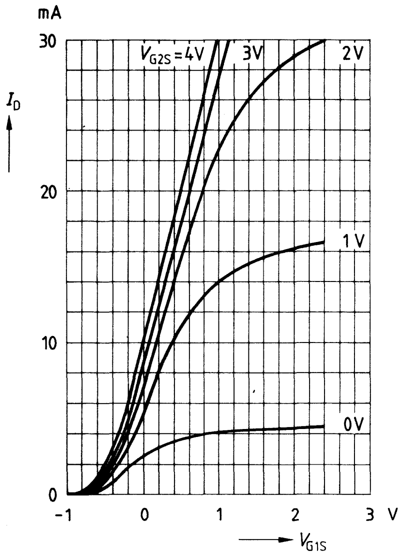
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



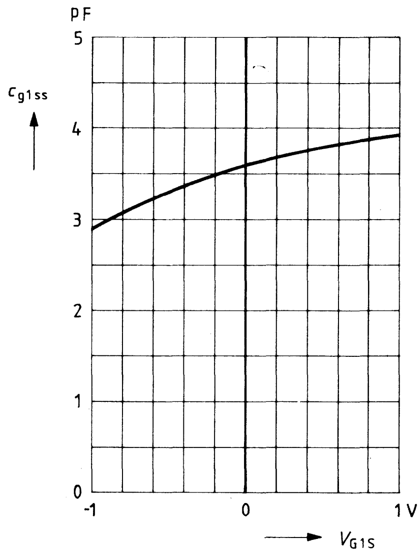
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



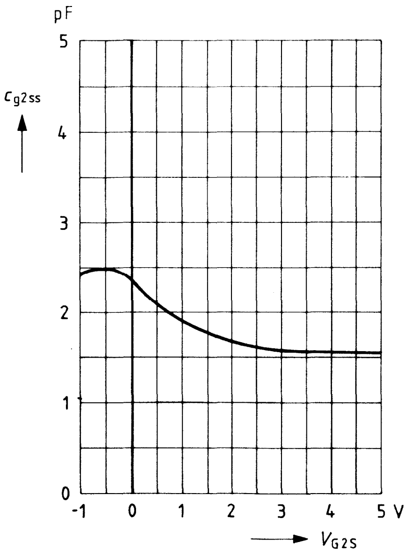
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15$ V



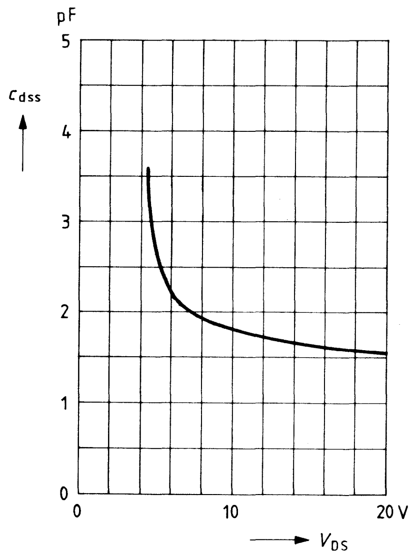
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



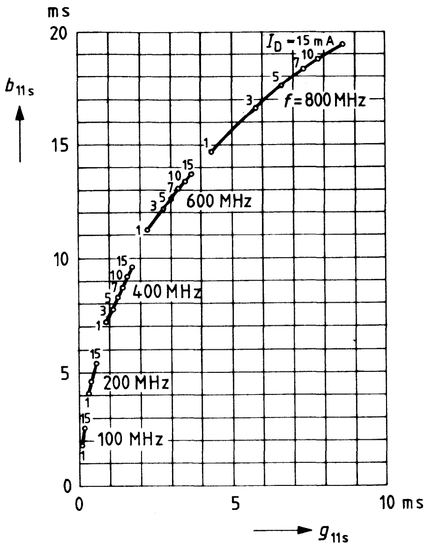
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0$ V, $V_{DS} = 15$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



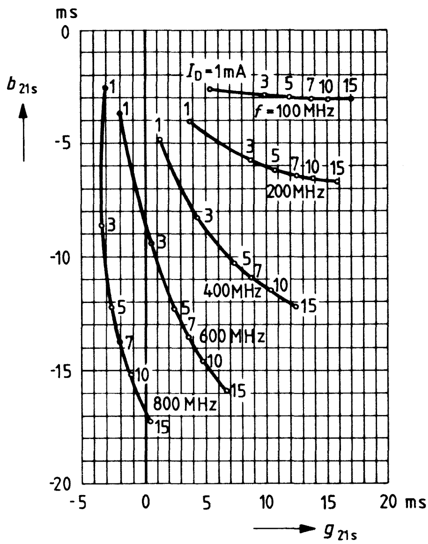
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0$ V, $V_{G2S} = 4$ V
$I_{DSS} = 10$ mA, $f = 1$ MHz



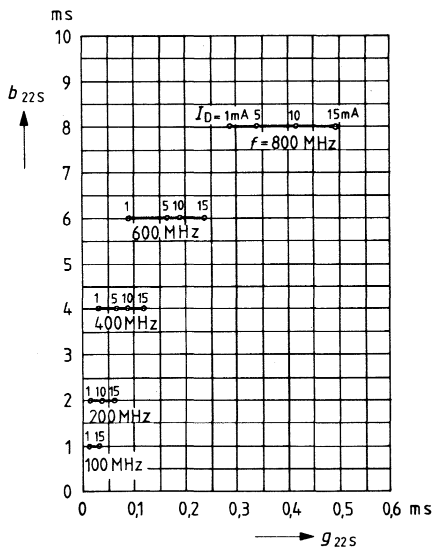
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



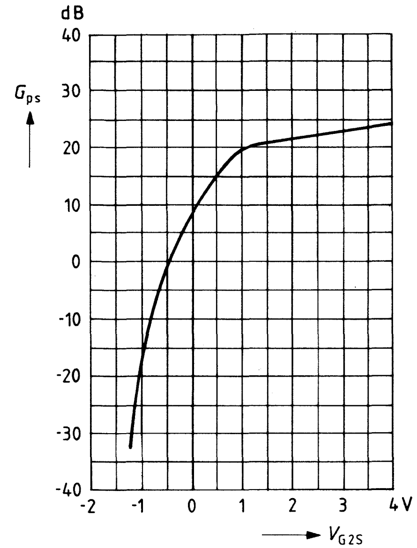
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



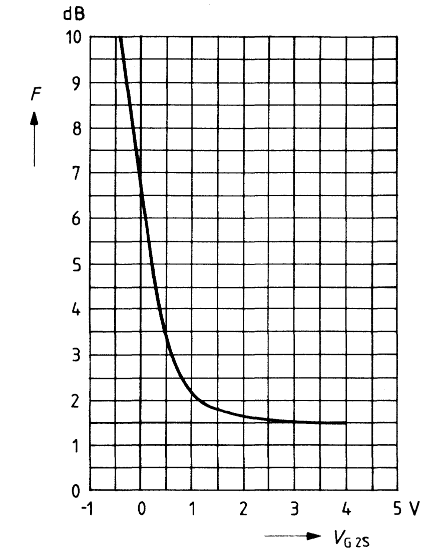
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



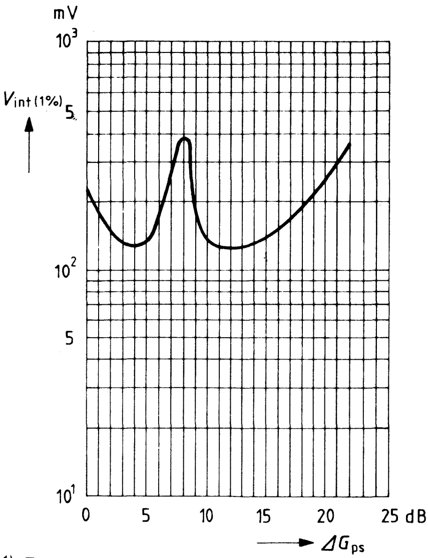
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit 1)



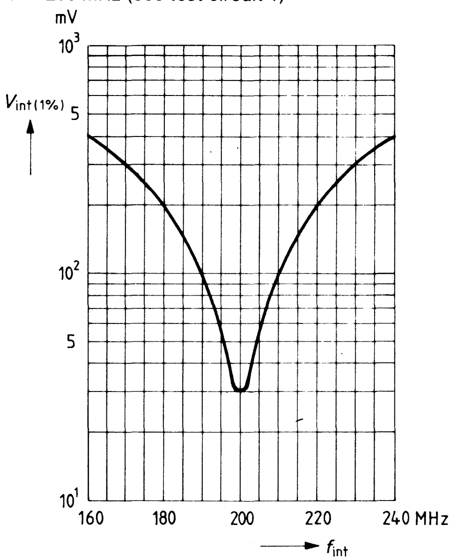
Noise figure $F = f(V_{G2S})$
$V_{DS} = 15$ V, $V_{G1S} = 0$ V, $I_{DSS} = 10$ mA
$f = 200$ MHz (see test circuit 1)



Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(\Delta G_{ps})$[1]
$V_{DS} = 15$ V, $V_{G1S} = 0$, $f = 200$ MHz
$f_{int} = 221$ MHz (see test circuit 1)

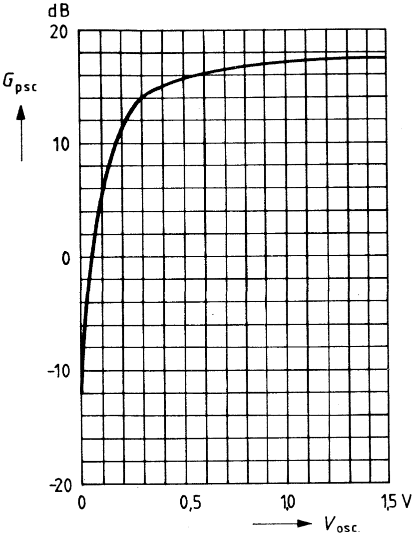


Interference voltage for 1% cross modulation
$V_{int\,(1\%)} = f(f_{int})$[1]
$V_{DS} = 15$ V, $V_{G2S} = 4$ V, $V_{G1S} = 0$
$f = 200$ MHz (see test circuit 1)

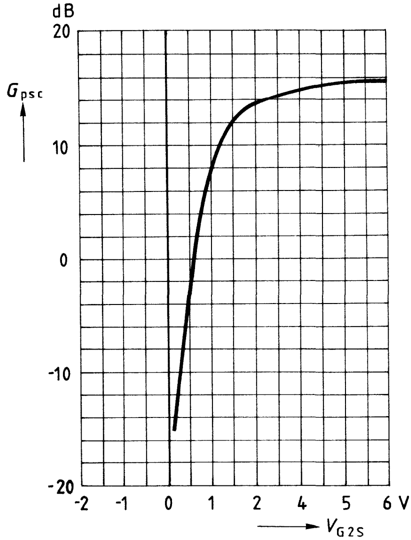


[1] Footnote see page 223

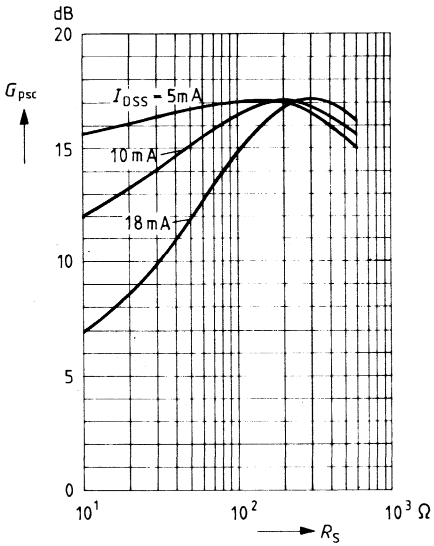
Mixer gain (additive) $G_{psc} = f(V_{osc})$
$V_D = 15$ V, $V_{G1S} = 0$, $V_{G2S} = 6$ V
$R_S = 220\ \Omega$, $I_{DSS} = 10$ mA, $f = 200$ MHz
$f_{IF} = 36$ MHz (see test circuit 2)



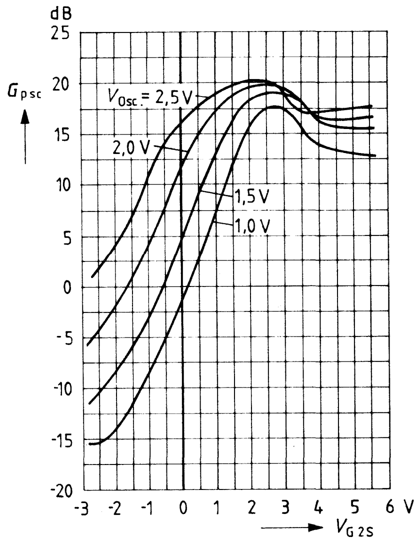
Mixer gain (additive) $G_{psc} = f(V_{G2S})$
$V_D = 15$ V, $V_{G1S} = 0$, $R_S = 220\ \Omega$
$V_{osc} = 0{,}5$ V, $I_{DSS} = 10$ mA, $f = 200$ MHz
$f_{IF} = 36$ MHz (see test circuit 2)



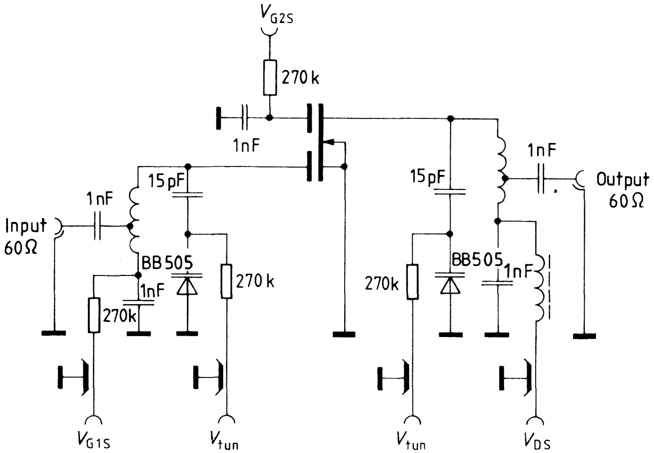
Mixer gain (additive) $G_{psc} = f(R_S)$
$V_D = 15$ V, $V_{G1S} = 0$, $V_{G2S} = 6$ V
$V_{osc} = 0{,}5$ V, $f = 200$ MHz
$f_{IF} = 36$ MHz (see test circuit 2)



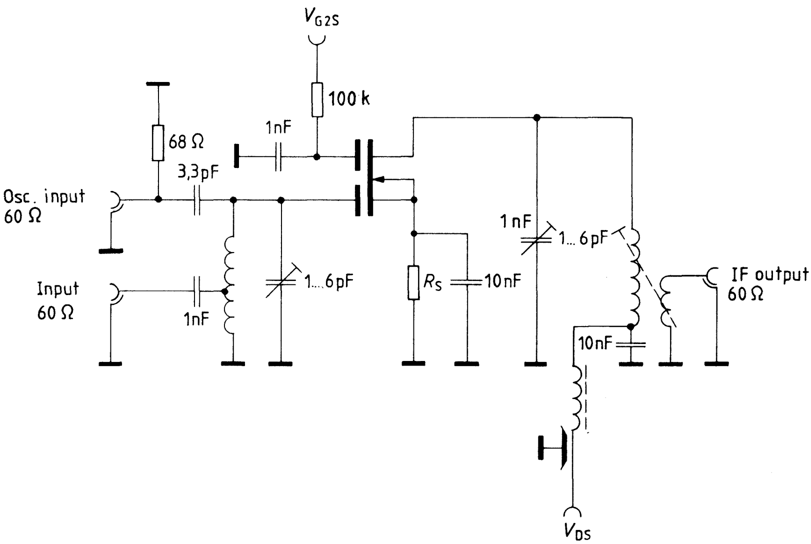
Mixer gain (multiplicative) $G_{psc} = f(V_{G2S})$
$V_D = 15$ V, $V_{G1S} = 1{,}7$ V, $R_S = 200\ \Omega$
$I_{DSS} = 10$ mA, $f = 200$ MHz
$f_{IF} = 36$ MHz (see test circuit 3)



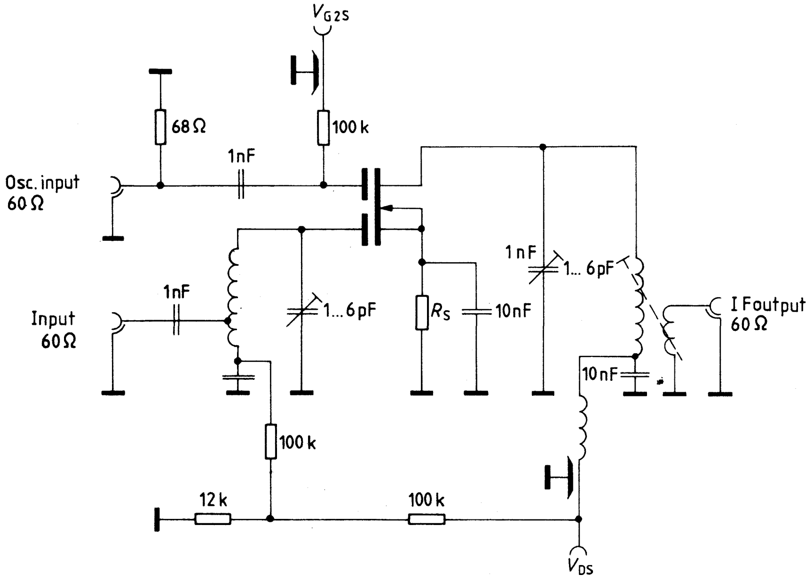
Test circuit 1 for power gain, noise figure and cross modulation
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



Test circuit 2 for mixer gain (additive)
f = 200 MHz, f_{osc} = 236 MHz, 2 Δf_{IF} = 5 MHz



Test circuit 3 for mixer gain (multiplicative)
f = 200 MHz, f_{osc} = 236 MHz, $2\,\Delta f_{IF}$ = 5 MHz



[1] $V_{int\ (1\%)}$ is the rms value of half the emf (terminal voltage at matching) of a 100% sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1% amplitude modulation on the active carrier.

- For input stages in UHF TV tuners
- High transconductance
- Low noise figure
- Miniature plastic package for surface mounting (SMD)

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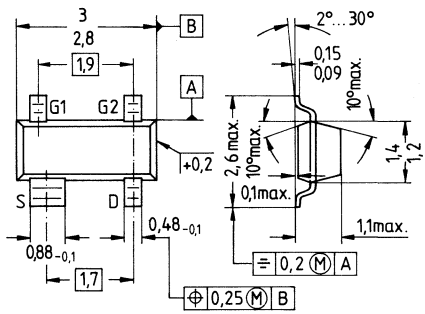


Dimensions in mm

Type	BF 996 S	
Ordering code	bulk: Q62702-F964	taped: Q62702-F1021
Marking	MH	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	– 55... + 150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction — ambient	$R_{th\,JA}$	≤450	K/W[1]

[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

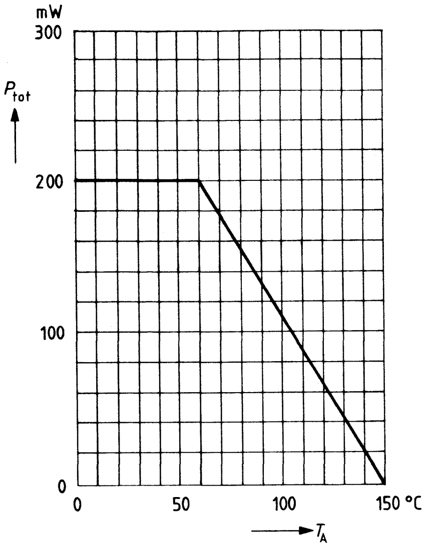
Characteristics ($T_A = 25\,°C$)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	2	–	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\,(p)}$	–	–	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\,(p)}$	–	–	2,0	V

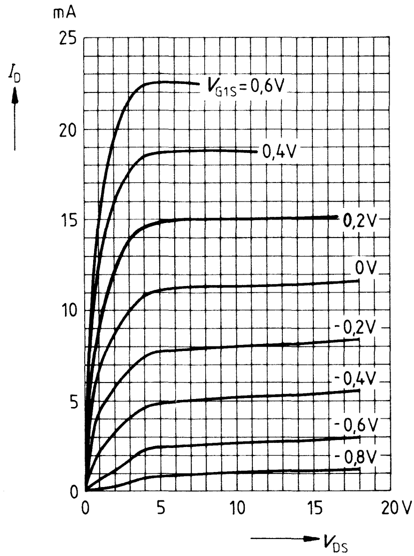
Characteristics ($T_A = 25\,°C$)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,kHz$	g_{fs}	15	18	—	mS
Gate 1 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{g1ss}	—	2,3	—	pF
Gate 2 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{g2ss}	—	1,1	—	pF
Feedback capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{dg1}	—	25	—	fF
Output capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	c_{dss}	—	0,8	—	pF
Power gain $V_{DS} = 15\,V$, $I_D = 10\,mA$	G_{ps}				
$f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit 1)		—	25	—	dB
$f = 800\,MHz$, $G_G = 2{,}5\,mS$, $G_L = 0{,}8\,mS$ (test circuit 2)		—	18	—	dB
Noise figure $V_{DS} = 15\,V$, $I_D = 10\,mA$	F				
$f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit 1)		—	1	—	dB
$f = 800\,MHz$, $G_G = 2{,}5\,mS$, $G_L = 0{,}8\,mS$ (test circuit 2)		—	1,8	—	dB
Gain control range $V_{DS} = 15\,V$, $V_{G2S} = 4 \ldots -2\,V$, $f = 800\,MHz$ (test circuit 2)	ΔG_{ps}	40	—	—	dB

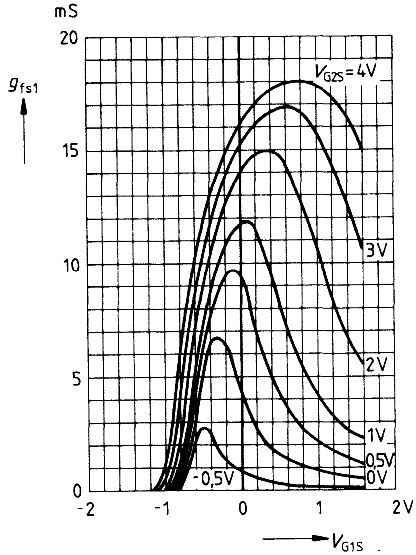
Total power dissipation $P_{tot} = f(T_A)$



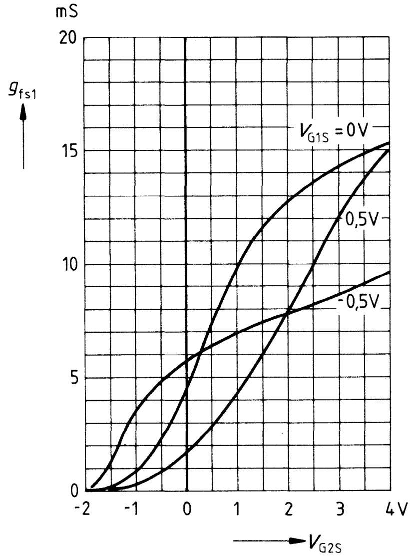
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



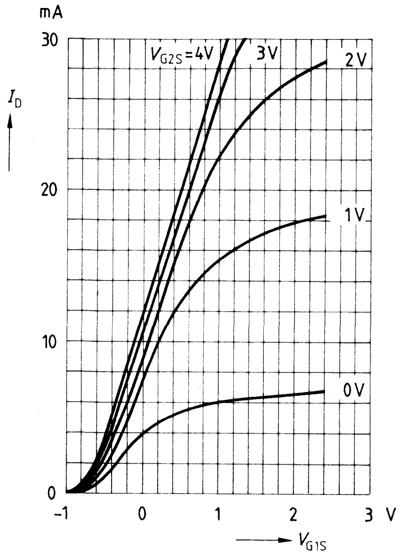
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



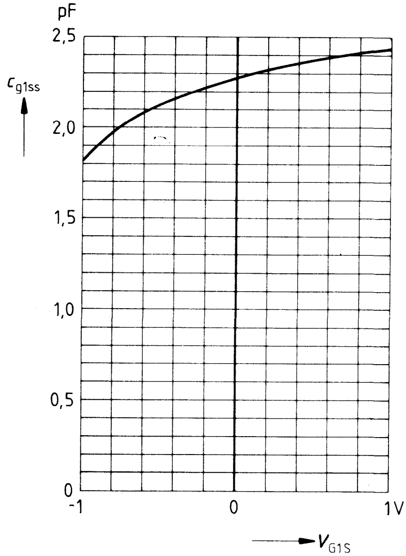
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



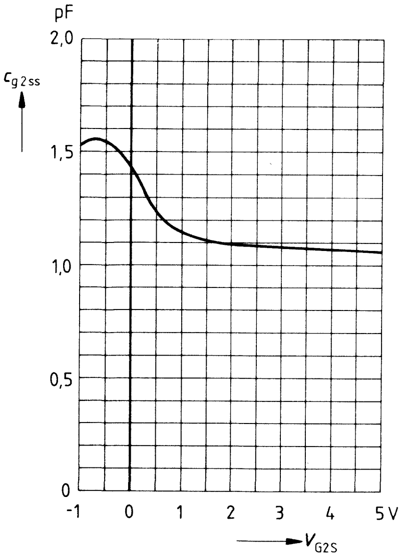
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15\ V$



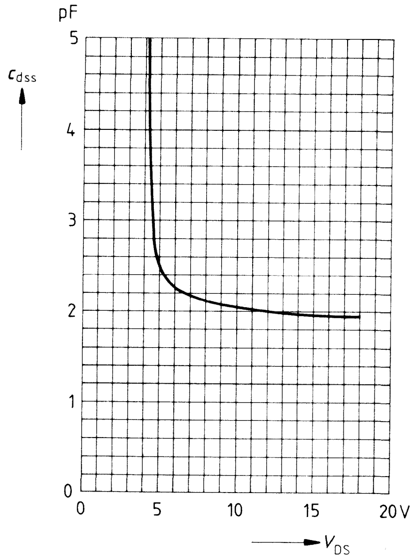
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



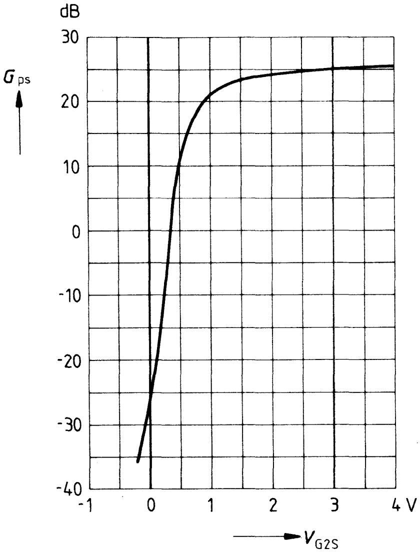
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



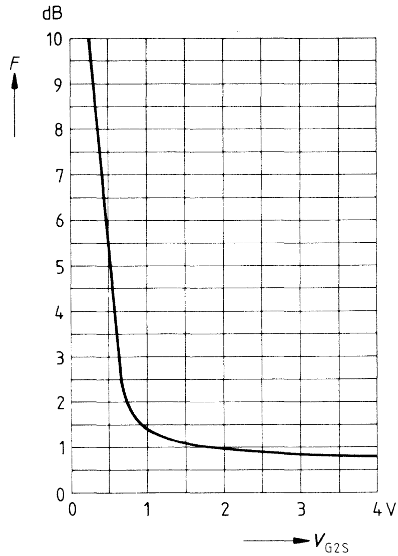
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0\ V$, $V_{G2S} = 4\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



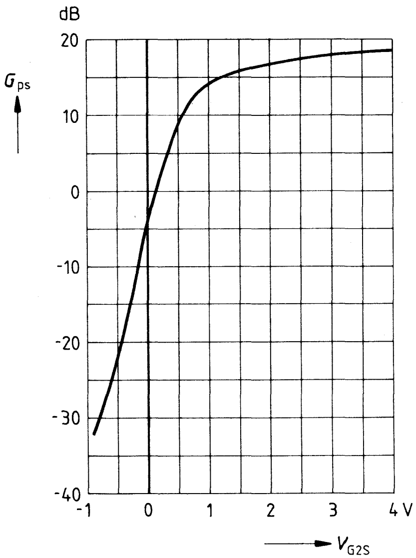
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 10 mA
f = 200 MHz (see test circuit 1)



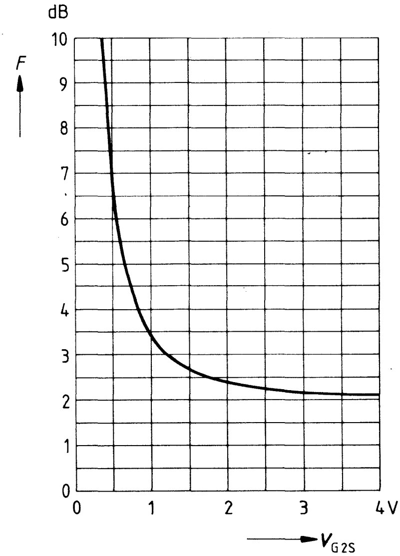
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 200 MHz (see test circuit 1)



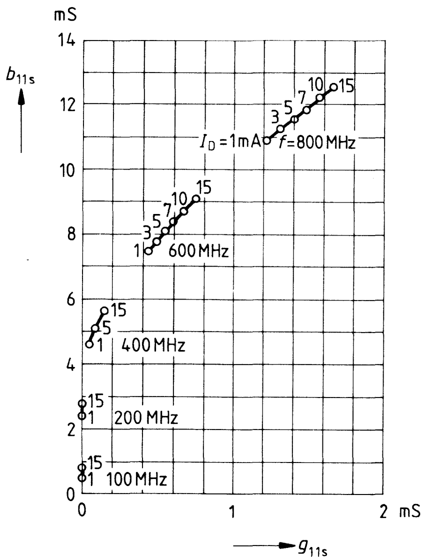
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0, I_{DSS} = 10 mA
f = 800 MHz (see test circuit 2)



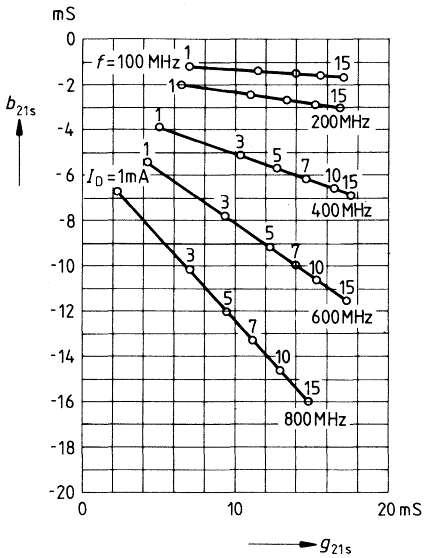
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f = 800 MHz (see test circuit 2)



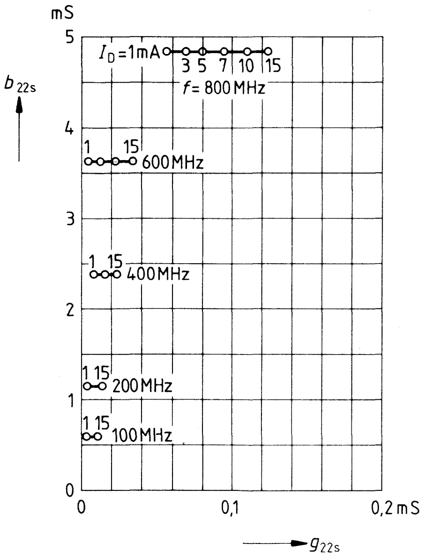
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



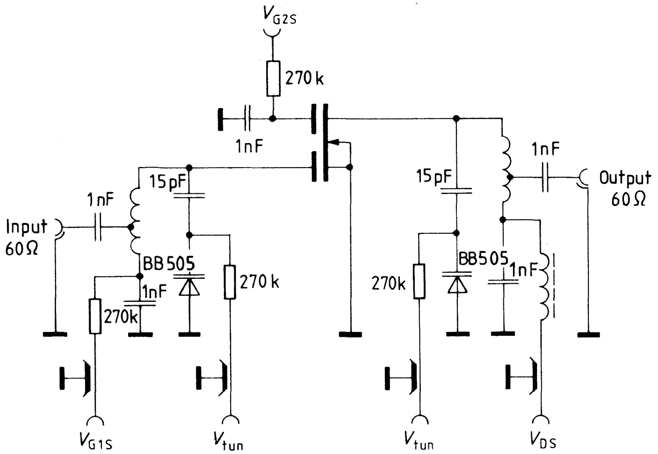
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



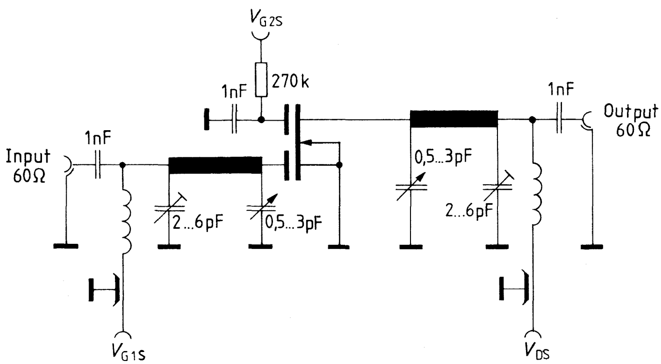
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



Test circuit 1 for power gain and noise figure
f = 200 MHz, G_G = 2 mS, G_L = 0,5 mS



Test circuit 2 for power gain, noise figure and cross modulation
f = 800 MHz, G_G = 2,5 mS, G_L = 0,8 mS

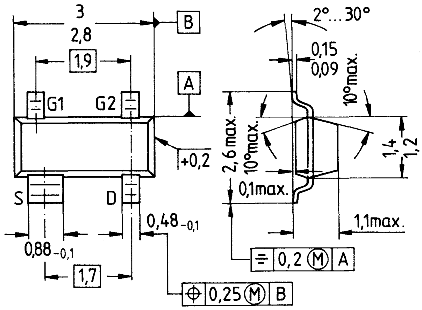


Silicon N Channel MOSFET Tetrode

BF 997

- Integrated suppression network against spurious VHF oscillations
- For VHF applications, especially in TV tuners with extended VHF band, e.g. in CATV tuners
- Miniature plastic package for surface mounting (SMD)

SOT 143



Dimensions in mm

Type	BF 997	
Ordering code	bulk: Q62702-F993	taped: Q62702-F1055
Marking	MK	

Maximum ratings

Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_A \leq 60\,°C$	P_{tot}	200	mW
Storage temperature range	T_{stg}	−55...+150	°C
Channel temperature	T_{Ch}	150	°C

Thermal resistance

Junction – ambient	R_{thJA}	≤450	K/W[1]

[1] Package mounted on alumina 16.7 mm × 15 mm × 0.7 mm

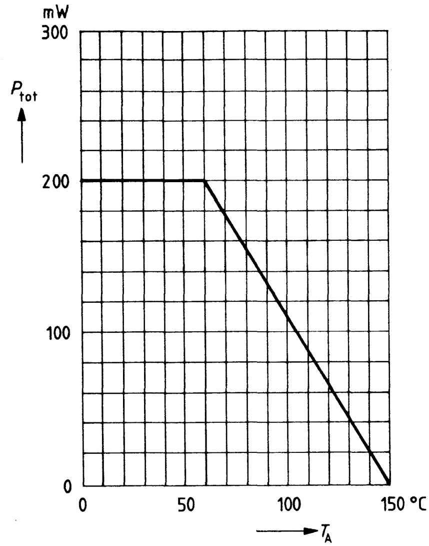
Characteristics ($T_A = 25\,°C$)

DC characteristics		**min**	**typ**	**max**	
Drain-source breakdown voltage $I_D = 10\ \mu A,\ -V_{G1S} = -V_{G2S} = 4\ V$	$V_{(BR)\,DS}$	20	–	–	V
Gate 1 source breakdown voltage $\pm I_{G1S} = 10\ mA,\ V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)\,G1SS}$	8,5	–	17	V
Gate 2 source breakdown voltage $\pm I_{G2S} = 10\ mA,\ V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)\,G2SS}$	8,5	–	17	V
Gate 1 source leakage current $\pm V_{G1S} = 5\ V,\ V_{G2S} = V_{DS} = 0$	$\pm I_{G1SS}$	–	–	50	nA
Gate 2 source leakage current $\pm V_{G2S} = 5\ V,\ V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$	–	–	50	nA
Drain current $V_{DS} = 15\ V,\ V_{G1S} = 0,\ V_{G2S} = 4\ V$	I_{DSS}	2	–	20	mA
Gate 1 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G2S} = 4\ V,\ I_D = 20\ \mu A$	$-V_{G1S\,(p)}$	–	–	2,5	V
Gate 2 source pinch-off voltage $V_{DS} = 15\ V,\ V_{G1S} = 0,\ I_D = 20\ \mu A$	$-V_{G2S\,(p)}$	–	–	2	V

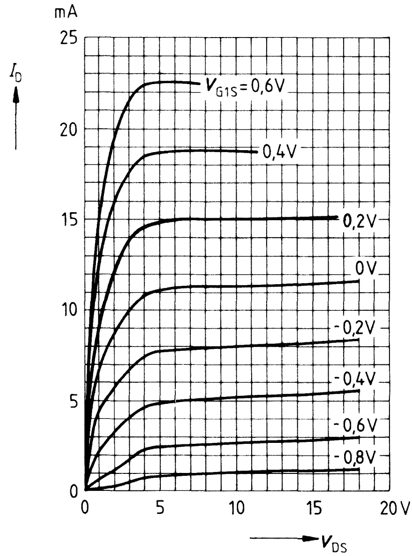
Characteristics ($T_A = 25\,°C$)

AC characteristics		**min**	**typ**	**max**	
Forward transconductance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,kHz$	g_{fs}	15	18	—	mS
Gate 1 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{g1ss}	—	2,5	—	pF
Gate 2 input capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{g2ss}	—	1,2	—	pF
Feedback capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{dg1}	—	25	—	fF
Output capacitance $V_{DS} = 15\,V$, $I_D = 10\,mA$, $V_{G2S} = 4\,V$, $f = 1\,MHz$	C_{dss}	—	1	—	pF
Power gain $V_{DS} = 15\,V$, $I_D = 10\,mA$ $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit)	G_{ps}	—	25	—	dB
Noise figure $V_{DS} = 15\,V$, $I_D = 10\,mA$ $f = 200\,MHz$, $G_G = 2\,mS$, $G_L = 0{,}5\,mS$ (test circuit)	F	—	1	—	dB
Gain control range $V_{DS} = 15\,V$, $V_{G2S} = 4 \ldots -2\,V$, $f = 200\,MHz$ (test circuit)	ΔG_{ps}	50	—	—	dB

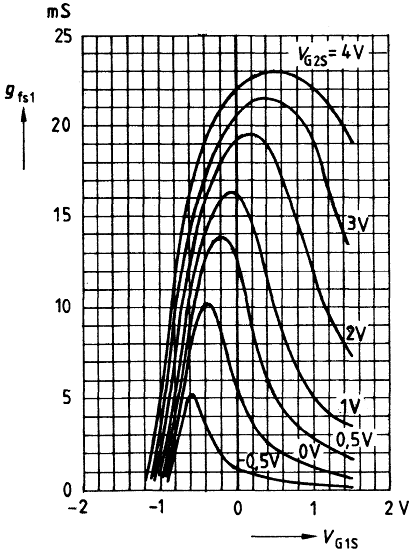
Total power dissipation $P_{tot} = f(T_A)$



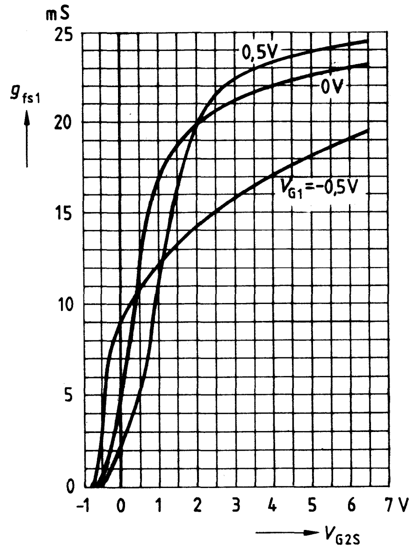
Output characteristics $I_D = f(V_{DS})$
$V_{G2S} = 4$ V



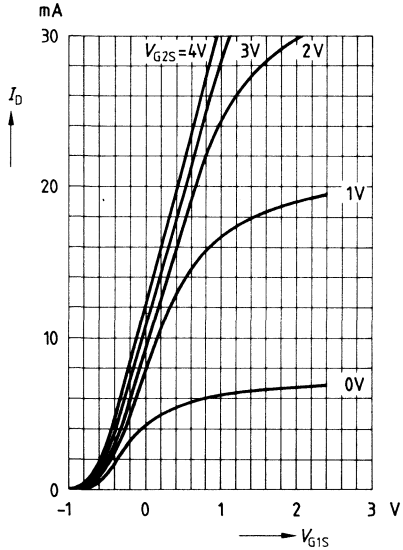
Gate 1 forward transconductance
$g_{fs1} = f(V_{G1S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



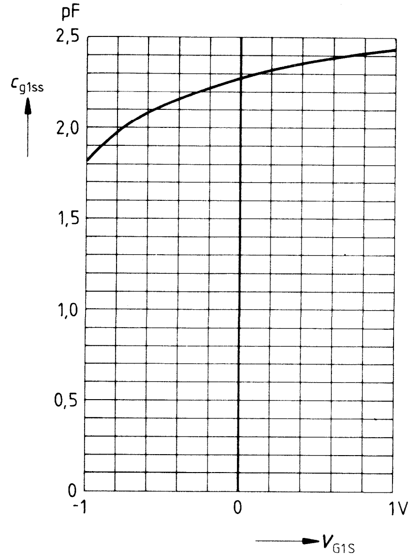
Gate 1 forward transconductance
$g_{fs1} = f(V_{G2S})$
$V_{DS} = 15$ V, $I_{DSS} = 10$ mA, $f = 1$ kHz



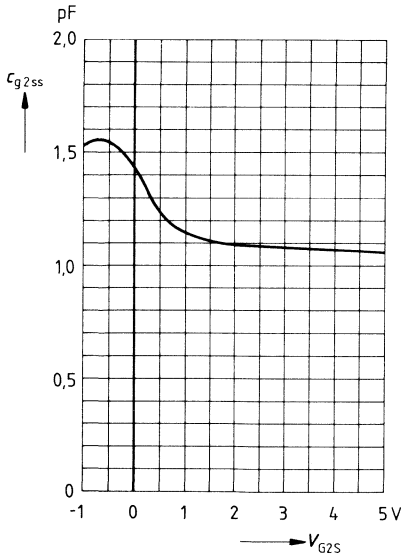
Drain current $I_D = f(V_{G1S})$
$V_{DS} = 15\ V$



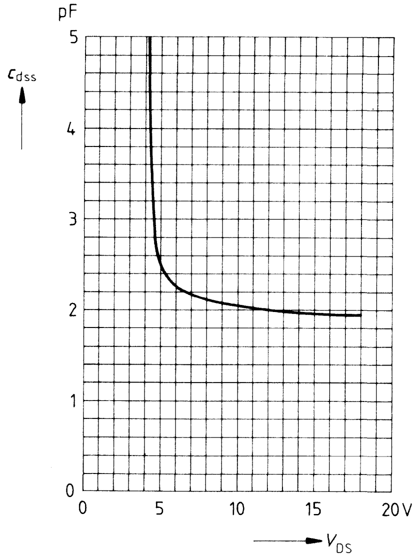
Gate 1 input capacitance $c_{g1ss} = f(V_{G1S})$
$V_{G2S} = 4\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



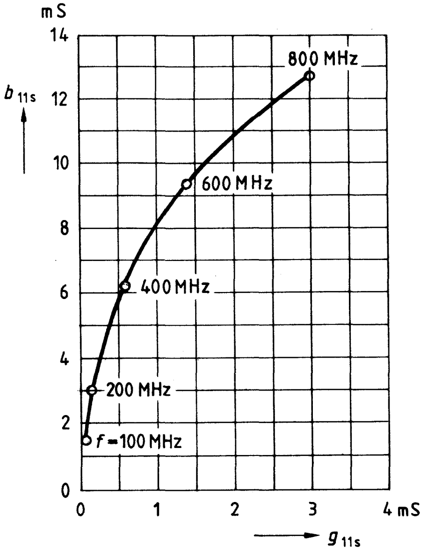
Gate 2 input capacitance $c_{g2ss} = f(V_{G2S})$
$V_{G1S} = 0\ V$, $V_{DS} = 15\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



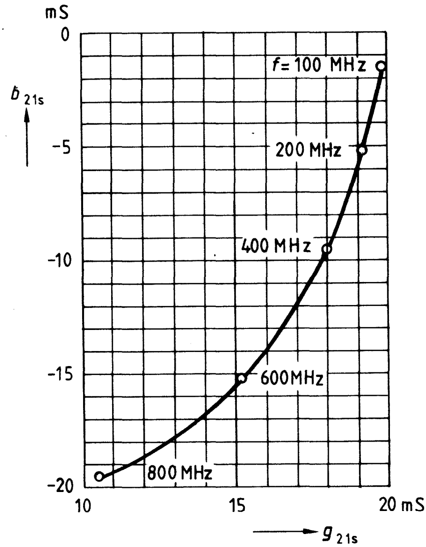
Output capacitance $c_{dss} = f(V_{DS})$
$V_{G1S} = 0\ V$, $V_{G2S} = 4\ V$
$I_{DSS} = 10\ mA$, $f = 1\ MHz$



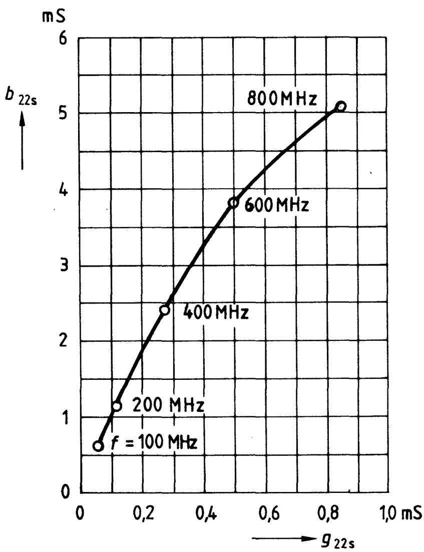
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



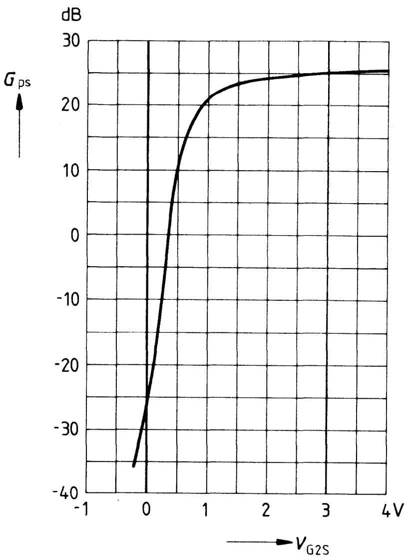
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



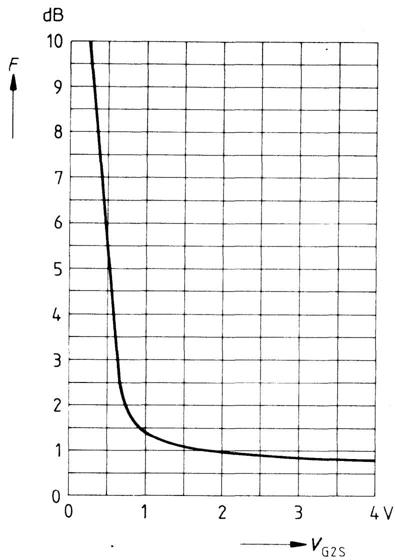
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



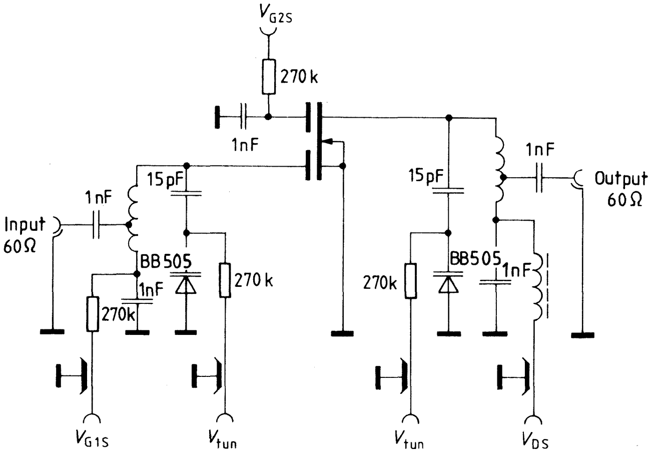
Power gain $G_{ps} = f(V_{G2S})$
$V_{DS} = 15\ V$, $V_{G1S} = 0\ V$
$I_{DSS} = 10\ mA$, $f = 200\ MHz$
(see test circuit)



Noise figure $F = f(V_{G2S})$
$V_{DS} = 15\ V$, $V_{G1S} = 0\ V$
$I_{DSS} = 10\ mA$, $f = 200\ MHz$
(see test circuit)



Test circuit for power gain and noise figure
$f = 200\ MHz$, $G_G = 2\ mS$, $G_L = 0{,}5\ mS$



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